**HRS DOCUMENTATION RECORD – REVIEW COVER SHEET**

Name of Site: Salt Chuck Mine

Contact Persons:

Site Investigations: Bureau of Land Management, April 1998, *Final Report Removal Preliminary Assessment, Salt Chuck Mine, Thorne Bay Ranger District, Tongass National Forest, Region 10 - Alaska*

URS Group, Inc., March 2007, *Engineering Evaluation/Cost Analysis (EE/CA) Draft Report,* prepared for the U.S. Department of Agriculture, Forest Service

Documentation Record: Franki J. Jewell, TechLaw Inc., Port Orchard, WA

Ken Marcy, U.S. Environmental Protection Agency, Region 10, Seattle WA

Pathways, Components, or Threats Not Scored

The ground water migration pathway, ground water-to-surface water component of the surface water migration pathway, the drinking water threat of the surface water migration pathway, soil exposure pathway, and air migration pathway were not scored as part of this Hazard Ranking System (HRS) evaluation. These pathways or components were not included because a release to these media does not significantly affect the overall site score and because the overland flow/flood component of the surface water migration pathway produces an overall site score well above the minimum required for the site to qualify for inclusion on the National Priorities List. These pathways are of concern to the U.S. Environmental Protection Agency (EPA) and may be evaluated during future investigations.

HRS DOCUMENTATION RECORD

Name of Site: Salt Chuck Mine

EPA Region 10 Date Prepared: September 2009

CERCLIS No.: AK0001897602

Street Address of Site: 4 air miles southwest of CY T72S R84E S17, Copper River Meridian, 3.5 air miles north of Karta Bay, Thorne Bay, Alaska, 99919 (Refs. 3; 4, p. 1)

County and State: Prince of Wales-Outer Ketchikan County, Alaska (Refs. 3; 4, p. 1)

General Location in the State: Prince of Wales Island, far Southeast portion of Alaska

Topographic Map: Craig C-2, Alaska, 1994 (Ref. 3).

Latitude: 55° 37’ 35.19” North Longitude: 132° 33’ 31.87” West (Ref. 3).

Latitude and Longitude coordinates reflect the approximate location of Source 2 at the mouth of the unnamed stream (Ref. 3; Figure 2).

| Scores | |
|---|---|
| Ground Water Pathway | NS |
| Surface Water Pathway | 100.00 |
| Soil Exposure Pathway | NS |
| Air Pathway | NS |
| | |
| HRS SITE SCORE | 50.00 |

*The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area in which the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, placed, or otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.*

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENTS SCORESHEET

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| **Drinking Water Threat** | | | |
| **Likelihood of Release:** | | | |
| 1. Observed Release | 550 | 550 | |
| 2. Potential to Release by Overland Flow: | | | |
| 2a. Containment | 10 | | |
| 2b. Runoff | 25 | | |
| 2c. Distance to Surface Water | 25 | | |
| 2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)] | 500 | | |
| 3.Potential to Release by Flood: | | | |
| 3a. Containment (Flood) | 10 | | |
| 3b. Flood Frequency | 50 | | |
| 3c. Potential to Release by Flood (lines 3a x 3b) | 500 | | |
| 4. Potential to Release (lines 2d + 3c, subject to a maximum of 500) | 500 | | |
| 5. Likelihood of Release (higher of lines 1 and 4) | 550 | | 550 |
| **Waste Characteristics:** | | | |
| 6. Toxicity/Persistence | (a) | 10,000 | |
| 7. Hazardous Waste Quantity | (a) | 10,000 | |
| 8. Waste Characteristics | 100 | | 100 |
| **Targets:** | | | |
| 9. Nearest Intake | 50 | 0 | |
| 10. Population: | | | |
| 10a. Level I Concentrations | (b) | 0 | |
| 10b. Level II Concentrations | (b) | 0 | |
| 10c. Potential Contamination | (b) | 0 | |
| 10d. Population (lines 10a + 10b + 10c) | (b) | 0 | |
| 11. Resources | 5 | 0 | |
| 12. Targets (lines 9 + 10d + 11) | (b) | | 0 |
| **Drinking Water Threat Score:** | | | |
| 13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a maximum of 100] | 100 | | 0 |
| **Human Food Chain Threat** | | | |
| **Likelihood of Release:** | | | |
| 14. Likelihood of Release (same value as line 5) | 550 | | 550 |
| **Waste Characteristics:** | | | |
| 15. Toxicity/Persistence/Bioaccumulation | (a) | $5X10^8$ | |
| 16. Hazardous Waste Quantity | (a) | 10,000 | |
| 17. Waste Characteristics | 1000 | | 1000 |

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENTS SCORESHEET

| | | | |
|---|---|---|---|
| **Targets:** | | | |
| 18. Food Chain Individual | 50 | 45 | |
| 19. Population | | | |
| 19a. Level I Concentration | (b) | 0 | |
| 19b. Level II Concentration | (b) | 0.03 | |
| 19c. Potential Human Food Chain Contamination | (b) | 0.0000003 | |
| 19d. Population (lines 19a + 19b + 19c) | (b) | 0.0300003 | |
| 20. Targets (lines 18 + 19d) | (b) | | 45.0300003 |
| **Human Food Chain Threat Score:** | | | |
| 21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to maximum of 100] | 100 | | 100 |
| **Environmental Threat** | | | |
| **Likelihood of Release:** | | | |
| 22. Likelihood of Release (same value as line 5) | 550 | | 550 |
| **Waste Characteristics:** | | | |
| 23. Ecosystem Toxicity/Persistence/Bioaccumulation | (a) | $5X10^8$ | |
| 24. Hazardous Waste Quantity | (a) | 10,000 | |
| 25. Waste Characteristics | 1000 | | 1,000 |
| **Targets:** | | | |
| 26. Sensitive Environments | | | |
| 26a. Level I Concentrations | (b) | 0 | |
| 26b. Level II Concentrations | (b) | 150 | |
| 26c. Potential Contamination | (b) | 0.07825 | |
| 26d. Sensitive Environments (lines 26a + 26b + 26c) | (b) | 150.07825 | |
| 27. Targets (value from line 26d) | (b) | | 150.07825 |
| **Environmental Threat Score:** | | | |
| 28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a maximum of 60] | 60 | | 60 |
| **Surface Water Overland/Flood Migration Component Score for a Watershed** | | | |
| 29. Watershed Score[c] (lines 13+21+28, subject to a maximum of 100) | 100 | | 100 |
| **Surface Water Overland/Flood Migration Component Score** | | | |
| 30. Component Score ($S_{sw}$)[c] (highest score from line 29 for all watersheds evaluated) | 100 | | 100 |
| [a] Maximum value applies to waste characteristics category<br>[b] Maximum value not applicable<br>[c] Do not round to nearest integer | | | |

WORKSHEET FOR COMPUTING HRS SITE SCORE

| | S pathway | $S^2$ pathway |
|---|---|---|
| Ground Water Migration Pathway Score ($S_{gw}$) | NS | NS |
| Surface Water Migration Pathway Score ($S_{sw}$) | 100 | 10000 |
| Soil Exposure Pathway Score ($S_s$) | NS | NS |
| Air Migration Score ($S_a$) | NS | NS |
| $S^2_{gw} + S^2_{sw} + S^2_s + S^2_a$ | | 10,000 |
| $(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4$ | | 2,500 |
| $\sqrt{(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4}$ | | 50.00 |

Notes:

NS - Not scored.

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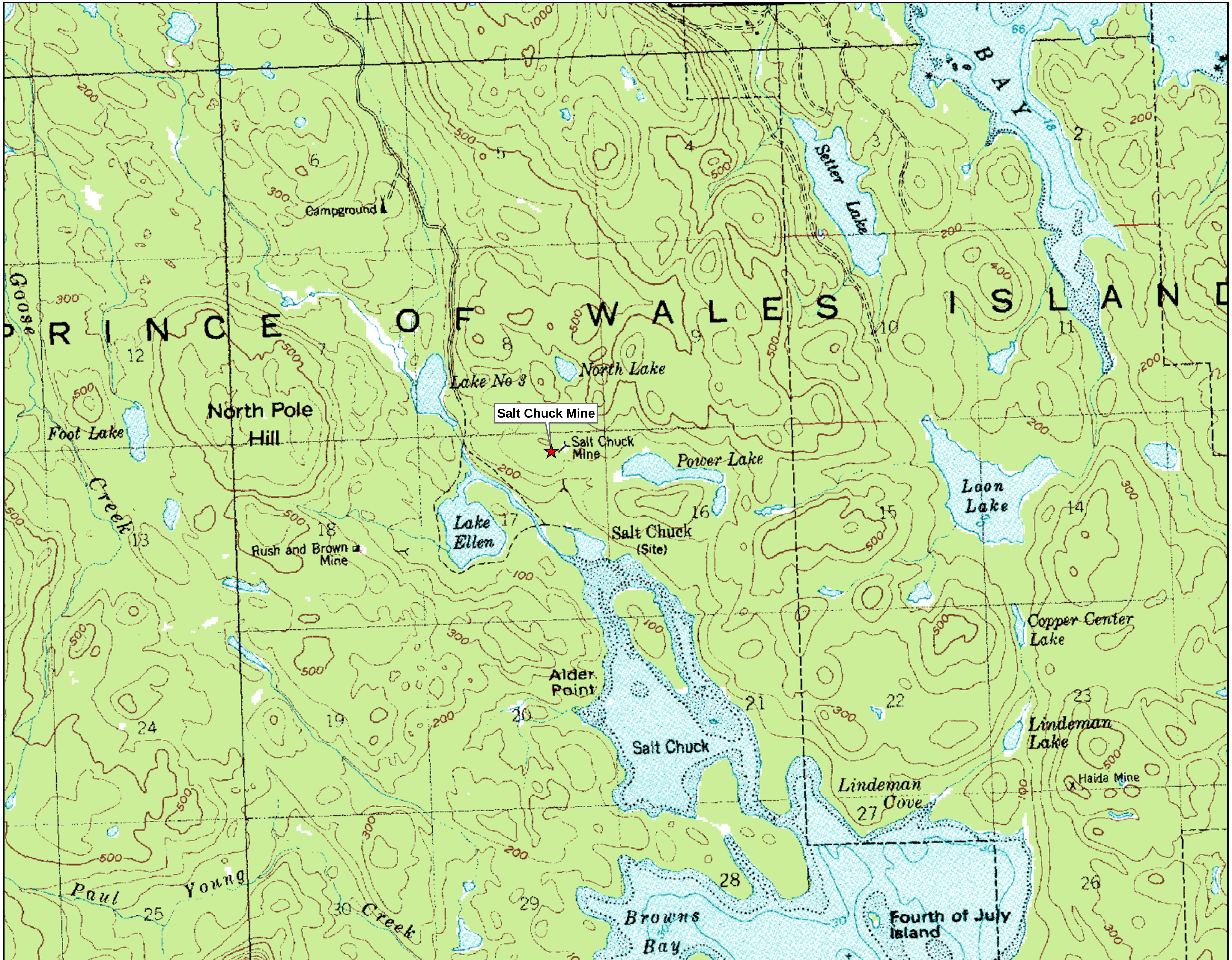
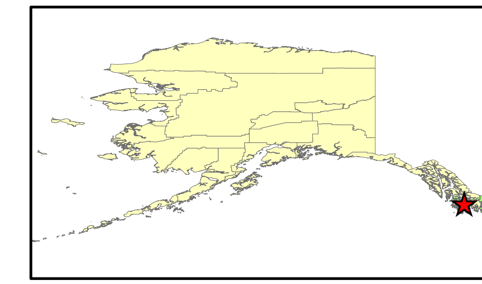



# Figure 1
# Salt Chuck Mine
# Site Location Map
# Prince of Wales
# Outer Ketchikan County, Alaska



Prince of Wales
Outer Ketchikan County, Alaska

★ Salt Chuck Mine

N

0 0.5 1 Miles

Source: USGS DRGs
Craig 15' Quads
Date: 07/02/08
Created by: MKS
Project: Region 9 ROC, Task Order 3,
Region 10 Federal Facility Site Assessments,
TDM 1-Salt Chuck Mine

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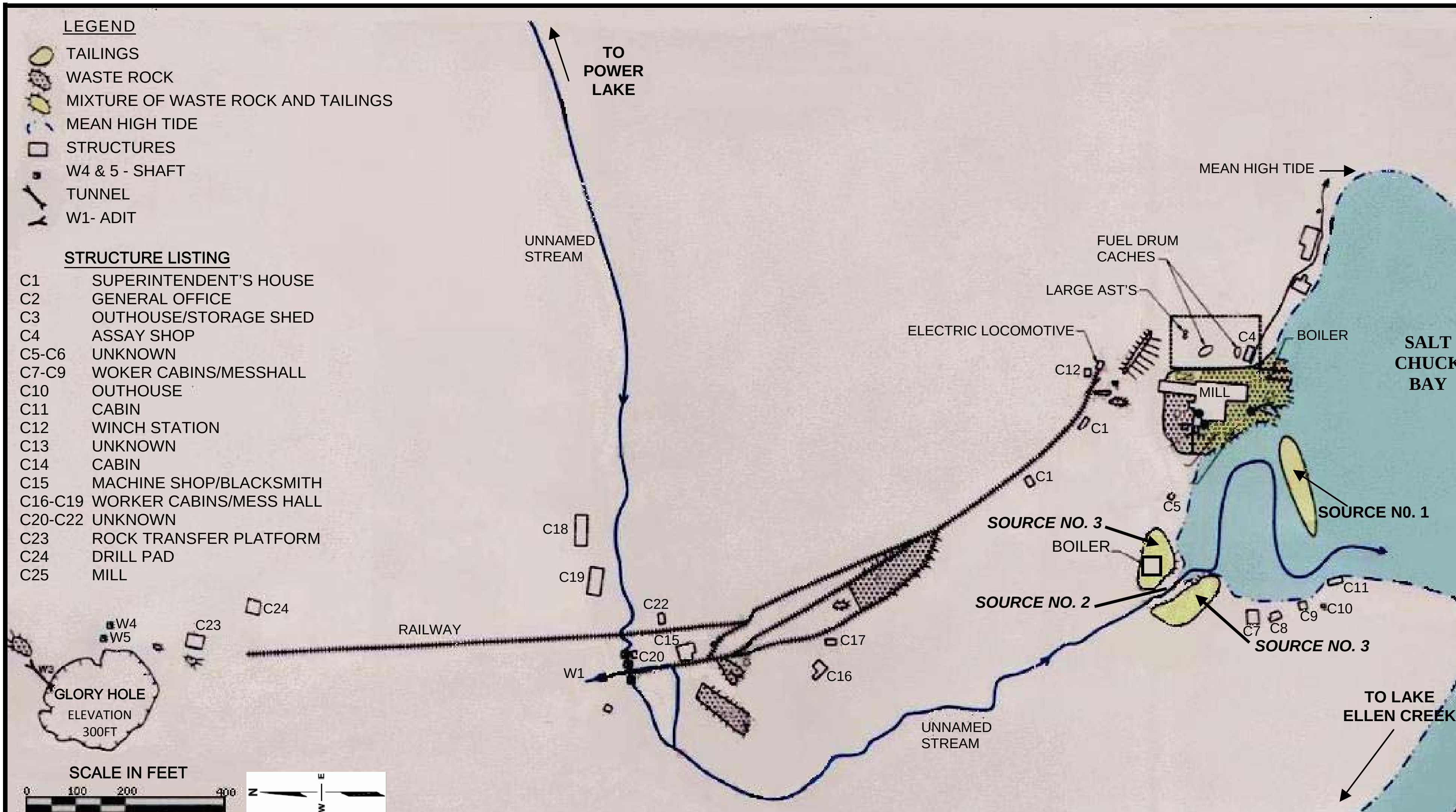
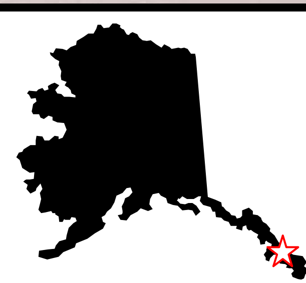



Source: Engineering Evaluation / Cost Analysis Draft Report dated March 2007
Created by: AJV
Date: 2/25/2009

Figure was adapted by TechLaw from the Engineering Evaluation/ Cost Analysis Draft Report (Ref. 6, Figures 2-2, 2-5) to depict the site layout.



Salt Chuck Mine, Prince of Wales Outer Ketchikan County, Alaska

**FIGURE 2**
**SITE LAYOUT MAP**
**SALT CHUCK MINE**

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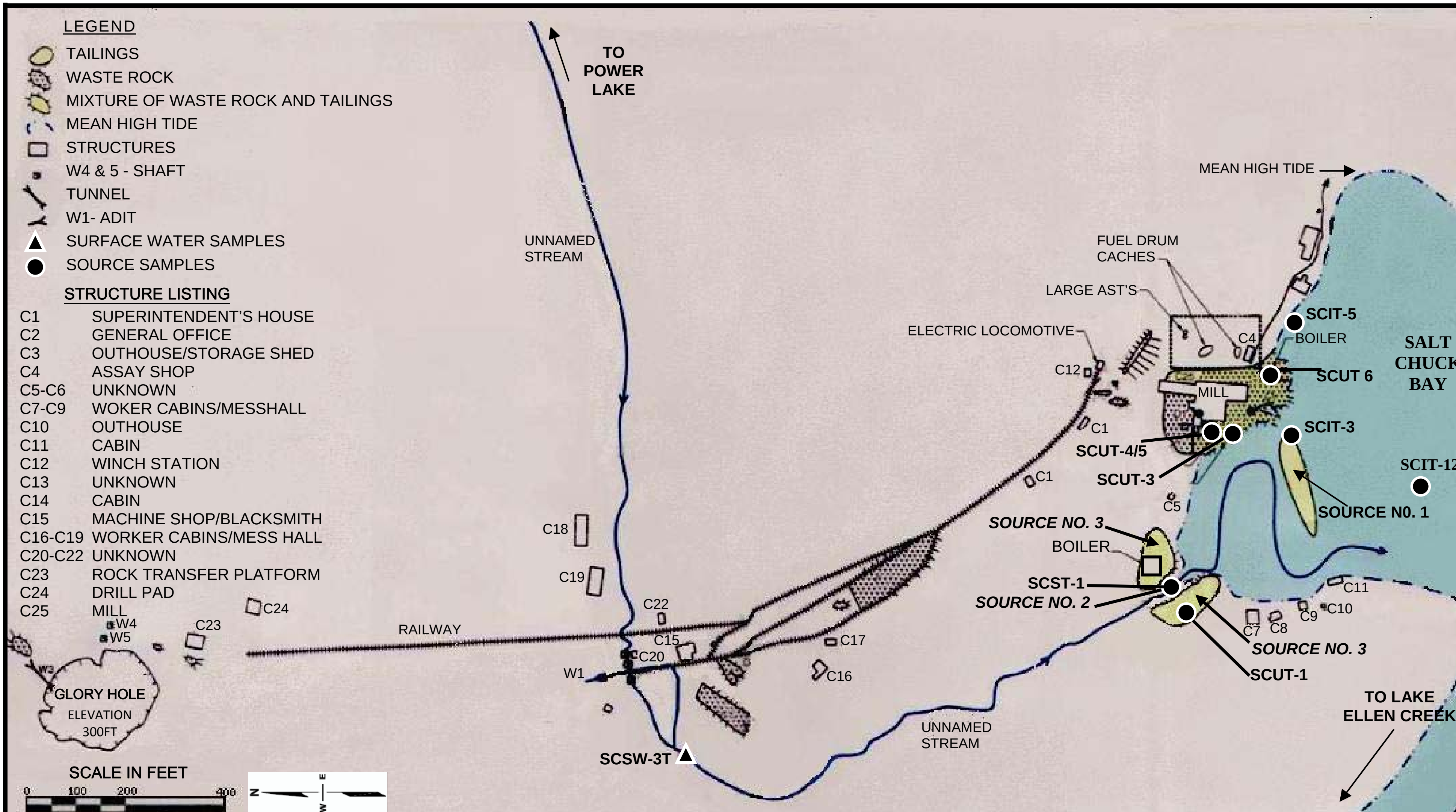
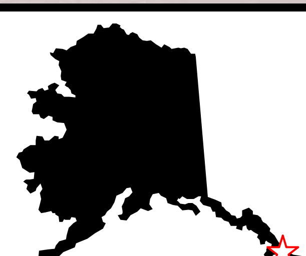



Source: Engineering Evaluation / Cost Analysis Draft Report dated March 2007
Created by: AJV
Date: 2/25/2009

Figure was adapted by TechLaw from the Engineering Evaluation/ Cost Analysis Draft Report (Ref. 6, Figures 2-2, 2-5) to depict the site layout.



Salt Chuck Mine, Prince of Wales Outer Ketchikan County, Alaska

# FIGURE 3
# SAMPLE LOCATION MAP
# SALT CHUCK MINE

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Source: Google Earth 2008©
Created by: AJV
Date: 10/12/2008
Figure was adapted by TechLaw to depict sample locations that were obtained from the Engineering Evaluation/Cost Analysis Draft Report (Ref. 6, Figures 2-1, 2-4, 2-6, 2-7).

SCALE:
0 MI 0.25 0.50 0.75 1.0

Salt Chuck Mine, Prince of Wales Outer Ketchikan County, Alaska

**LEGEND**

⊗ - TISSUE SAMPLE
△ - SURFACE WATER SAMPLE
□ SEDIMENT SAMPLE
○- SURFACE SOIL SAMPLE
●- SOURCE SAMPLE
-

# FIGURE 4
# SAMPLE LOCATION MAP
# SALT CHUCK MINE

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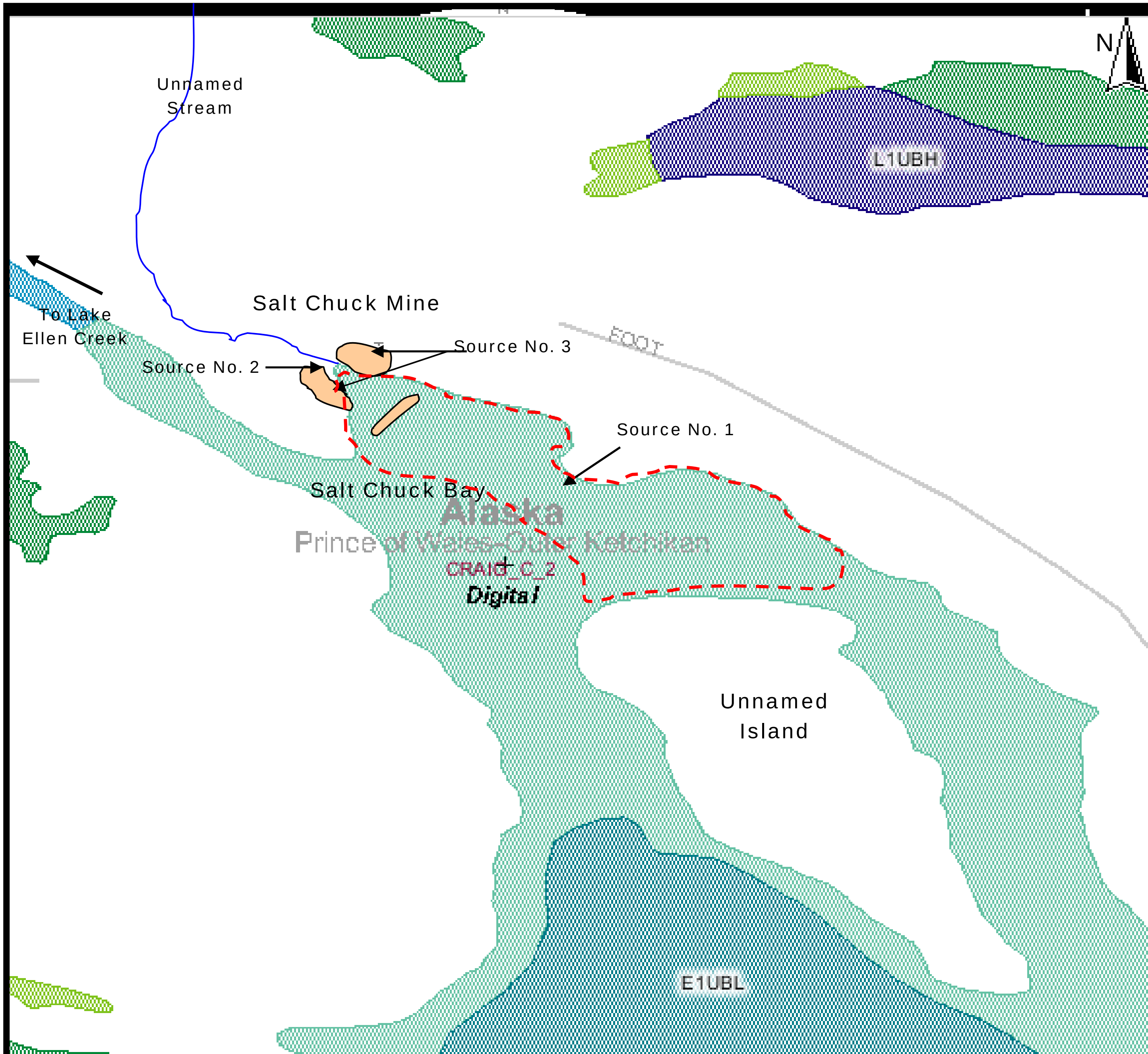
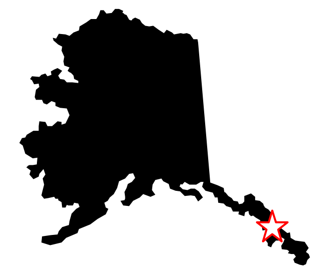



# Figure 5
# Wetland and Source Location Map
# Salt Chuck Mine



Salt Chuck Mine, Prince of Wales Outer Ketchikan County, Alaska

## LEGEND

- Estuarine and Marine Wetland
- Estuarine and Marine Deepwater
- Unsaturated Tailing Piles
- Approximate Boundary of Tailings

Scale:
0 ft 500 1000

Created by: AJV Date: March 30, 2009
Source: USFW Wetlands Online Mapper. Sources, Unnamed Stream, Unnamed Island, and Lake Ellen Creek labels added by TechLaw using Reference 6 Figures 2-2, 2-4, and 2-6.

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## REFERENCES


| Reference Number | Description of the Reference |
|---|---|
| 1. | U.S. Environmental Protection Agency (EPA), December 14, 1990, Hazard Ranking System, Final Rule, 40 CFR Part 300, Appendix A, 55 FR 51532. Available Online at http://www.epa.gov/superfund/sites/npl/hrsres/index.htm. Excerpt, 5 pages. A complete copy of the HRS Final Rule is available from the Region's Docket upon request. |
| 2. | U.S. EPA, Superfund Chemical Data Matrix. January 2004, excerpt. Accessed Online at http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm. Excerpt, 23 pages |
| 3. | U.S. Geological Survey, 15-Minute topographic map, Craig B-1, Alaska, 1949 (Revised 1993); Craig B-2, Alaska, 1997; Craig B-3, Alaska, 1949 (Revised 1993); Craig C-1, Alaska, 1950 (Revised 1993); Craig C-2, Alaska, 1994; Craig C-3, Alaska, 1950 (Revised 1993). Scale 1:63,360. 1 Map. Note: Franki Jewell, TechLaw Project Manager, added labels to Reference 3 to depict the Salt Chuck Mine site location, source areas and target distance limits. Source areas were obtained from the 2007 U.S. Department of Agriculture Alaska Region, Forest Service. Engineering Evaluation/Cost Analysis Draft Report for Salt Chuck Mine, Tongass National Forest (Reference 6, below, Figures 2-2, 2-4, and 2-5). |
| 4. | EPA. Envirofacts Data Warehouse. Facility Site Name: USDA FS Tongass NF:Salt Chuck Mine. Accessed online at: http://oaspub.epa.gov/enviro/fii_query_dtl.disp_program_facility?p_registry_id=110009331749 and http://oaspub.epa.gov/enviro/cerclis_web.report?pgm_sys_id=AK0001897602. Date accessed: September 18, 2008. 4 pages. |
| 5. | Alaska Division of Community and Regional Affairs. Alaska Community Database Community Information Summaries. Accessed online at http://www.commerce.state.ak.us/dca/commdb/CIS.cfm. Date accessed: June 30, 2008. 4 pages. |
| 6. | U.S. Department of Agriculture, Alaska Region, Forest Service. Engineering Evaluation/Cost Analysis Draft Report for Salt Chuck Mine, Tongass National Forest, Alaska. Prepared by URS Group, Inc. March 2007. Excerpt, 2,670 pages |
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| 8. | Seatrails. Hiking, Cultural History Trail in Thorne Bay, Southeast Alaska. http://www.seatrails.org/com_thornebay/trl-saltchuck.htm. Date accessed: April 29, 2008. 1 page. |
| 9. | Marketwire. Nevada Star Resource Corp. Completes Name Change, Amalgamation, Stock Consolidation and Reverse Take Over Transaction with Pure Nickel Inc. March 30, 2007. Accessed online at http://eclipse.sys-con.com/node/355970. Date accessed: September 29, 2008. 2 pages. |

10. Securities and Exchange Commission, Washington, D.C. Form 6-K. Report of Foreign Private Issuer Pursuant to Rule 13a-16 or 15d-16 of the Securities Exchange Act of 1934 for the month of November 2007. Pure Nickel Inc. (formerly "Nevada Star Resource Corp."). Commission File Number: 000-25489, 95 Wellington Street West Suite 900, Toronto, Ontario M5J 2N7, Canada. Accessed online at http://msnmoney.brand.edgar-online.com/EFX_dll/EDGARpro.dll?FetchFilingHTML1?ID=5559170&SessionID=jD3hWZnjVRJFbg9. Date accessed: September 29, 2008. 68 pages.

11. Pure Nickel Inc. Salt Chuck Project – Salt Chuck Property. Accessed online at: http://www.purenickel.com/s/Salt_Chuck.asp?printVersion=now&ReportID=201332, and http://www.purenickel.com/s/newsreleases.asp?printversion=now&reportid=267258, and http://www.purenickel.com/s/newsreleases.asp?printversion=now&reportid=284875. Date accessed: April 29, 2008. 7 pages.

12. Franki Jewell, ROC Project Manager, TechLaw Inc., Memorandum to File, with Attachment. Subject: Copy of logbook notes recorded during the 2002 and 2006 EE/CA sampling investigations conducted at the Salt Chuck Mine, Tongass National Forest, Alaska. March 27, 2008. 5 pages.

13. M. Gray, URS Group, Inc., Copy of logbook notes from 2002 EE/CA Sampling Event. July 22 – 26, 2002. Note: Copy was adapted by Franki Jewell, ROC Project Manager, TechLaw Inc.; page numbers were added to each logbook page, beginning with the first page after the cover, because the copy provided did not contain page numbers. 14 pages

14. M. Vania, URS Group, Inc., Copy of logbook notes from 2002 EE/CA Sampling Event. July 23 – 26, 2002. Note: Copy was adapted by Franki Jewell, ROC Project Manager, TechLaw Inc.; page numbers were added to each logbook page, beginning with the first page after the cover, because the copy provided did not contain page numbers. 14 pages

15. J. Deters, URS Group, Inc., Copy of logbook notes from 2002 EE/CA Sampling Event. July 23 – 26, 2002. 14 pages.

16. Mark Vania, URS Group, Inc., Copy of logbook notes from 2006 EE/CA Sampling Event. September 26 – 30, and October 4 – 6, 2006. 23 pages.

16A. Eric Klein, URS Group, Inc., Copy of logbook notes from 2006 EE/CA Sampling Event. September 27 – 30, and October 2, and 4 – 6, 2006. 26 pages.

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18. Alaska Department of Natural Resources, Division of Mining, Land, and Water. Prince of Wales Island Area Plan. Originally adopted June 1985; revised October 1998. Accessed online: http://www.dnr.state.ak.us/mlw/planning/areaplans/wales/index.cfm. Date accessed: October 13, 2008. Excerpt, 144 pages.

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20. Juneau Empire. Kate Golden. Dirty Old Mines. March 23, 2008. Accessed online at http://www.juneauempire.com/stories/032308/loc_260770395.shtml. Date accessed: April 29, 2008. 4 pages.

21. U.S. Department of the Interior, Fish and Wildlife Service. National Wetlands Inventory Maps. Craig (B-1), Alaska, 1989; Craig (B-2), Alaska, 1995; Craig (B-3), Alaska, 1995; Craig (C-1), Alaska, 1995; Craig (C-2), Alaska, 1995; and Craig (C-3), Alaska, 1995. 6 Maps. Note: Franki Jewell, TechLaw Project Manager, added labels to the map indicating source locations; source locations were obtained from the 2007 U.S. Department of Agriculture Alaska Region, Forest Service. Engineering Evaluation/Cost Analysis Draft Report for Salt Chuck Mine, Tongass National Forest (Reference 6, above, Figures 2-2, 2-4, and 2-5).

22. Tom Pearson, Senior Chemist, TechLaw Inc., Memorandum to File. Subject: The use of PQLs in the analytical results of samples collected during the 2002 and 2006 EE/CA sampling investigations and how PQLs relate to HRS definitions of detection limits (This Memorandum is limited to metals data). March 31, 2009. 2 pages.

23 Tom Pearson, Senior Chemist, TechLaw Inc., Memorandum to File. Subject: Second Party review of the URS data validation conducted on the analytical results of samples collected during the 2002 and 2006 EE/CA sampling investigations. March 31, 2009. 2 pages.

24. United States Geological Survey. Water Resources of the United States. Water-Data Report WDR-US-2008. Water-resources data for the United States Water Year 2008. Accessed online at http://wdr.water.usgs.gov/wy2008/search.jsp. Date accessed: March 27, 2009. 16 pages.

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26. Richard J. Peterson, President, Organized Village of Kasaan, letter to Dan Opalski, Director of Environmental Cleanup, Environmental Protection Agency. December 18, 2008. 1 page.

## General Site Description and History

The Salt Chuck Mine site (or the site) is located on the Prince of Wales Island, in the Tongass National Forest, Outer Ketchikan County, Alaska, at the northern end of Kasaan Bay, approximately 4.5 miles south-southwest of Thorne Bay, Alaska (Refs. 3; 4, p.1). A Site Site Location Map is presented as Figure 1. A Site Layout Map is presented as Figure 2.

The nearest year-round residential population is located at Thorne Bay, which is located 47 air miles northwest of Ketchikan on the east coast of Prince of Wales Island, and is accessible from Salt Chuck Mine by road and trail (Refs. 3; 5, p. 2; 6, p. 2). The nearest community accessible by water is the Native village of Kasaan, located on the east side of Kasaan Bay, approximately 10 miles southeast of Salt Chuck Mine (Ref. 6, p. 2). Salt Chuck Mine is located in a mineral-rich area known for much historic mining activity. The Rush & Brown Mine is located on the west slope of Lake Ellen, which is located southwest of Salt Chuck Mine. Venus Mine is located approximately 1.5 miles southwest of Salt Chuck Mine in an area that drains south into Karta Bay. Haida Mine is located northeast of Browns Bay and approximately 2.5 miles southeast of Salt Chuck Mine (Refs. 3; 6, p. 2).

The upland portion of the Salt Chuck Mine area comprises approximately 45 acres. Former mine workings are located at elevations between 100 and 300 feet above mean sea level and consist of a large glory hole connected to a main haulage adit, two mine shafts, and a tunnel. The remnants of at least 25 structures were present at Salt Chuck Mine as of 2006. Former buildings are located near the beach, along the tramway leading from the main haulage adit to the former mill, upstream along an unnamed stream that flows past the portal of the main haulage adit and near the glory hole. Buildings and former mining camps include cabin areas formerly used to house and feed workers, a superintendent's house, a general office, a blacksmith or machine shop, a large mill, and platforms used to load and transfer rock. Two large aboveground storage tanks (ASTs) that previously contained diesel fuel to supply four banks of Fairbanks Morse diesel engines were noted to be present adjacent to the mill (Refs. 6, p. 3; 7, p. 3).

Thirteen mine waste rock dumps, ranging in size from over 100 cubic yards ($yd^3$) to over 4,000 $yd^3$, are distributed along a 0.5 mile corridor from the northeast side of the glory hole, south to the mill area located at the head of Salt Chuck Bay. A large amount of waste rock also was used to create a tramway bed leading from the main haulage adit to the mill (Refs. 6, p. 3; 7, p. 3). The well known 1-mile Salt Chuck Mine Trail runs through the Salt Chuck Mine property and provides outdoor enthusiasts access to the area (Refs. 7, p. 34; 8). In addition, it has been reported that rock climbers regularly use the Salt Chuck Mine glory hole for rappelling (Refs. 6, p. 6; 7, p. 34).

An extensive tailings deposit comprising approximately 100,000 $yd^3$ of material, evaluated as Source No. 1, is located in the intertidal zone south and southeast of the mill. The intertidal tailings are divided into four zones based on natural boundaries and elevations and were identified as Zones A through D. Zones A and B are larger tailings piles and are located west of a rock jetty and northeast of the piers, respectively. Zones C and D are smaller, flatter piles that spread out to the south and southeast, and are only visible at low tide (Ref. 6, pp. 7, 12, Figures 2-4 and 2-5). At low tide, Zones A and B are bisected by a seep and reentrant flowing southeasterly along the piers to a confluence with Lake Ellen Creek (Ref. 6, pp. 12, 13).

Reportedly, the tailings piles have relatively distinct elevation gradients identified by changes in surface expression on aerial photos. The texture and color of the tailings material is reported to be predominantly homogeneous throughout the intertidal deposition zone (Ref. 6, p. 13, Photo, p. P-7)

Smaller areas of tailings are located above the intertidal zone along the tailings spit, around the mill, adjacent to the unnamed stream, and in the bottom of the unnamed stream. The tailings located in the stream bed of the unnamed stream are referred to as saturated stream bottom tailings and are evaluated as Source No. 2. The smaller areas of tailings located above the intertidal zone are referred to as the unsaturated tailings and will be evaluated as Source No. 3. Combined, the saturated intertidal tailings, saturated stream bottom tailings, and unsaturated tailings cover approximately 23 acres (Ref. 6; p. 3)

As indicated in the 2007 Draft EE/CA Report, analytical results of samples collected from on-site tailings were divided into three groups: unsaturated tailings (tailings located above the intertidal zone), saturated tailings (tailings located in the intertidal zone), and saturated stream bottoms (tailings located in the bottom of the unnamed stream) (Ref. 6, p. 9, 10).

In 1905, the first claims to Salt Chuck Mine, which was originally named Goodro Mine, were staked, and by 1907, approximately 35 feet of adit had been driven, a short shaft sunk, and several surface cuts had been opened (Refs 6, p. 2; 7, p. 9). In 1915, J.A. Chilberg formed the Salt Chuck Mining Company. The discovery that the ore contained palladium/platinum led to construction of the mill with a capacity of processing 30 tons of ore per day in 1917. In 1923, the mill was enlarged to a capacity of 300 tons per day. At some point in or after 1923, Salt Chuck Mining Company reorganized as the Alaskan Palladium Mining Company and continued mining activities until 1926 (Ref. 7, p. 9). In 1929, John Koel purchased the property and optioned it to the Solar Development Co., a subsidiary of Consolidated Mining and Smelting Co., Ltd. Solar Development Co. explored the mine with diamond drilling and extensive sampling until 1931, when it dropped the option. Between 1934 and 1941, the Alaska Gold and Metals Company retreated 11,000 tons of tailings and mined 80,000 tons of ore from the original stopes (Ref. 7, p. 9). In 1941, production at Salt Chuck Mine ceased. Copper, gold, silver, and platinum group elements, most notably palladium, were the primary ores produced from Salt Chuck Mine (Ref. 6, p. 2). Between 1905 and 1941, total production from Salt Chuck Mine yielded 326,000 tons of ore at an average grade of 0.95 percent copper, 0.063 ounces per ton (oz/ton) palladium, 0.036 oz/ton gold, and 0.17 oz/ton silver (Ref. 7, p. 9).

In 1943 and 1944, the U.S. Bureau of Mines completed 1,550 feet of drilling at Salt Chuck Mine, and U.S. Geological Survey mapped the geology of the mine (Ref. 7, p. 9). In 1958, Utah Construction and Mining Company optioned Salt Chuck Mine and continued assessment work until 1963, when the company dropped the option. From 1967 through 1972, Newmont held a claim block over Salt Chuck Mine and conducted an airborne magnetic survey and drilled several holes attempting to locate additional ore. In 1978, the Bureau of Mines returned to the property to collect samples for its statewide assessment of platinum group metals as part of a critical and strategic minerals program (Ref. 7, pp. 9, 10).

In 1979, Fox Geological Services, Inc., and Orbex Industries Ltd. staked claims in the area of the Salt Chuck Mine. In 1980, Orbex Industries Ltd. acquired an option to the entire parcel and held its interest through 1989, at which time Silver Glance Resources Inc. took over Orbex Industries Ltd., and continued to work the area. Fox Geological Services, Inc., maintained its claims until 1996, and in December 1996, Stealth Ventures, Inc. restaked claims at the Salt Chuck Mine property (Ref. 7, p. 10). In 2000, Santoy Resources, Inc., conducted an exploration program in the Salt Chuck Mine area, and as of early 2007, held active mining claims for 1,590 acres extending from approximately 200 feet north of the former mill to the northwest, beyond Lake Ellen. Nevada Star Resource Corporation held approximately 620 acres of unpatented Federal mining claims northeast of the mill near Power Lake and extending southeast of the mill and tailings areas along the coastline, east of the unnamed island (Ref. 6, pp. 2, 3). In 2007, Nevada Star Resource Corporation and Pure Nickel Inc., consolidated and became Pure Nickel Inc. (Refs. 9, p. 1; 10, p. 14). Pure Nickel Inc., currently owns 31 unpatented federal mining claims covering approximately 620 acres of prospective ground near Salt Chuck Mine and an additional 115 federal lode mining claims adjacent to the existing unpatented federal mining claims covering approximately 1,660 acres (Ref. 10, pp. 21, 43). In October 2007, Pure Nickel Inc., announced its plans to begin an exploration program at the Salt Chuck property near the old mine area (Refs. 10, pp. 45, 58; 11, p. 3).

Various Federal investigations have been conducted at Salt Chuck Mine (Refs. 6, pp. 8, 9; 7, pp. 1, 2, 12). At some point during the 1995 through 1996 timeframe, the U.S. Bureau of Land Management (BLM) conducted a preliminary inventory of physical and chemical hazards at the Salt Chuck Mine which resulted in the recommendation for a preliminary assessment (Ref. 7, pp. 2, 12, 13). BLM collected samples and conducted a Preliminary Assessment (PA) at the Salt Chuck Mine from 1995 to 1997. The data collected was used to provide guidance to determine if additional environmental sampling was necessary (Refs. 6, pp. 8, 10; 7, p. 13). The BLM PA identified hazards posing a potential threat to human health and the environment and recommended that a non-time critical removal be conducted at the Salt Chuck Mine site (Refs. 6, pp. 8 – 10; 7, pp. 35, 36).

In March 2007, URS Group Inc., on behalf of the U.S. Department of Agriculture, Forest Service (Forest Service), prepared an Engineering Evaluation/Cost Analysis (EE/CA) Draft Report for removal actions at Salt Chuck Mine (Ref. 6, pp. ES-1, 1). In 2002 and 2006, as part of the EE/CA, URS Group Inc. conducted sampling events at Salt Chuck Mine to further characterize the nature and extent of contaminants, conduct a risk-based evaluation of related data, and assess removal action alternatives to prevent or mitigate releases at the site (Ref. 6, pp. ES-1, 1, 8, 9). The URS Group Inc. Draft EE/CA concluded that chemical concentrations in Salt Chuck Mine source areas pose a threat to human health or the environment and recommended that wastes identified at Salt Chuck Mine be consolidated in an “onsite repository” and capped, based on the alternatives evaluation and a comparative analysis of various removal action alternatives. URS Group Inc. concluded that consolidating wastes in an “onsite repository” and capping the repository meets the threshold criteria of human health and environmental protection and complies with applicable or relevant and appropriate requirements (Ref. 6, pp. ES-1, ES-2, 91).

The site as scored in this documentation record for HRS purposes includes tailings piles located in the intertidal zone south and southeast of the mill (Source 1, Saturated Intertidal Tailings);

tailings located in the stream bed of an unnamed creek (Source 2, Saturated Stream Bottom Tailings); smaller areas of tailings located above the intertidal zone along the tailings spit, around the mill, and adjacent to the unnamed stream (Source 3, Unsaturated Tailings); and associated releases of mining-related metals and PCBs to Salt Chuck Bay and the unnamed stream.

## SOURCE DESCRIPTION

### 2.2 SOURCE CHARACTERIZATION

Number of the Source: 1

Name and description of the source: Saturated Intertidal Tailings (Tailings Pile)

An extensive tailings deposit comprising approximately 100,000 $yd^3$ of material is located in the intertidal zone south and southeast of the mill. The intertidal tailings are divided into four zones based on natural boundaries and elevations and were identified as Zones A through D. Zones A and B are large and are located west of a rock jetty and northeast of the piers, respectively. Zones C and D are smaller and flatter, and spread out to the south and southeast. Zones C and D are only visible at low tide (Ref. 6, pp. 7, 12, Figures 2-4 and 2-5, Photos pp. P-2 – P-4, P-7). At low tide, Zones A and B are bisected by a seep and reentrant flowing southeasterly along the piers to a confluence with Lake Ellen Creek (Ref. 6, pp. 12, 13). Reportedly, the tailings have relatively distinct elevation gradients identified by changes in surface expression on aerial photos. The texture and color of the tailings material is reported to be predominantly homogeneous throughout the intertidal deposition zone (Refs. 6, p. 13, Photo, p. P-7). During the 2002 EE/CA sampling investigation, tailings were reported to be at least 2.5 feet deep in some areas near the northeast point of the unnamed island (in Zone D) (Refs. 6, Figure 2-11; 12; 14, p. 22).

Based on information provided in the EE/CA (Reference 6), including text, figures, photographs, and logbook notes (References 13 through 16A) documenting the 2002 and 2006 sampling events, it could not be precisely determined if the intertidal tailings deposit (Source 1) is one large pile or is composed of several piles. However, based upon an evaluation of the information provided, including the delineation of the approximate boundaries of tailings presented on the EE/CA figures, it appears as if the intertidal tailings deposit is predominantly one large pile. Distinct demarcations between individual piles appear to be lacking. The intertidal tailings deposit may have comprised several distinct piles at one point in time, however, the movement of the tides over time has likely moved tailings once located on the land into Salt Chuck Bay, and any individual piles have likely blended to become one large pile (Refs. 6, pp. 7, 13, Figures 2-3 - 2-5, and 2-9, Photos, pp. P-2 – P – 4, P-7, P-10).

Smaller areas of tailings are located above the intertidal zone (referred to as unsaturated tailings) along the tailings spit, around the mill, adjacent to the unnamed stream, and in the bottom of the unnamed stream. The tailings located in the stream bed of the unnamed stream are referred to as saturated stream bottom tailings and are evaluated as Source No. 2. The smaller areas of tailings located above the intertidal zone are referred to as the unsaturated tailings and will be evaluated as Source No. 3. Combined, the saturated intertidal tailings, saturated stream bottom tailings, and unsaturated tailings cover approximately 23 acres (Refs. 6; p. 3, Figures 2-2 and 2-4).

Inorganic analytical results of samples collected from the saturated intertidal tailings during the 2002 and 2006 EE/CA sampling events revealed detectable levels of arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc (Ref. 6, Table 2-11).

Inorganic analytical results of samples collected from the saturated intertidal tailings during the 1995 and 1997 BLM sampling events revealed detectable levels of arsenic, barium, chromium, copper, lead, mercury, silver, and vanadium (Ref. 6, Table 2-11). The 1995 and 1997 BLM sampling results are cited only for additional supporting information.

Organic analytical results of samples collected from the saturated intertidal tailings during the 2002 EE/CA sampling events revealed detectable levels of PCBs (Ref. 6, Table 2-12).

Organic analytical results of samples collected from the saturated tailings during the 1995 sampling event only included diesel range organics. No organic analytical results were reported for the 1997 sampling event (Ref. 7, pp. Table 2-12). The 1995 and 1997 BLM sampling results were not used for HRS scoring purposes and are presented only for additional supporting information.

<u>Location of the source, with reference to a map:</u>
The saturated intertidal tailings are located within the northern portion of the shallow Salt Chuck Bay, located south of Salt Chuck Mine (Refs. 3; 6, pp. 2, 3, Figure 2-4). See Figure 2 in this documentation record.

<u>Containment</u>
Release to Surface Water via Overland Migration and/or Flood: The saturated intertidal tailings are located within Salt Chuck Bay and are not contained in a manner that prohibits contaminants within the tailings from migrating into the waters of Salt Chuck Bay. There is no evidence of a maintained engineered cover, or functioning and maintained run-on control system and runoff management system associated with the saturated intertidal tailings (Refs. 6, pp. 2, 3, Figure 2-4, Figure 2-6; 7, p. 32). Therefore, a containment value of 10 is assigned (Ref. 1, p. 51609, Table 4-2).

Containment Value: 10

### 2.2.2 Hazardous Substances

Tables 1 and 2 below list hazardous substances present in the intertidal tailings located within Salt Chuck Bay based on analytical results from the EE/CA 2002 and 2006 sampling investigations (Ref. 6, pp. 9, 10, 12 – 15, 17). Although not required when documenting hazardous substances associated with a source area, as a conservative approach, only inorganic sample results exceeding concentrations detected in background samples, included to represent concentrations of inorganics typical of native soil, are included in Tables 1 and 2 below. Furthermore, analytical results of background samples are presented to demonstrate the relative increase in hazardous substance levels in the tailings waste, and thus the increased threat posed to the environment, as compared to naturally occurring levels in surrounding soils.

For Source No. 1, sediment sample SCSD-12, collected from Browns Bay, a control location west of Gosti Island, approximately 2.4 miles south of the intertidal tailings piles, is used as the background sample for the intertidal tailings pile samples collected during the 2002 sampling investigation (Refs. 3; 6, pp. 9, 10, 15, Table 2-13). Background sample SCSD-12 was collected near Gosti Island and consisted of gravel and medium sands (Refs. 6, p. 13, Table 2-13; Figure 4 of this HRS documentation record; 12; 14, pp. 15, 16). Gosti Island area was reported to be similar to Salt Chuck (Refs. 12; 14, p. 15). The 2002 and 2006 background samples were collected from a control location west of Gosti Island, which is located outside the range of activities that occurred at Salt Chuck Mine (Refs. 3; 6, p. 13, Table 2-13). Sample Locations are presented in Figures 3 and 4.

During the 2002 EE/CA sampling investigation, five samples (SCIT-3, SCIT-5, SCSD-9, SCSD-10, and SCSD-18), plus two duplicate samples were collected from the intertidal tailings and were analyzed for priority pollutant metals and vanadium by CT&E Environmental Services, Inc. Samples SCIT-3, SCIT-5, SCSD-9, SCSD-10, and SCSD-18 also were analyzed for polychlorinated biphenyls (PCB) (Ref. 6, pp 13 - 15, Table 2-11, App. A, pp. A-150 – A-153, A-158 – A-163). Background sample SCSD-12 was analyzed for priority pollutant metals and vanadium; however, sample SCSD-12 was not analyzed for PCBs (Ref. 6, p. 13, Table 2-13, App. A. p. A-222). Furthermore, no samples other than tailings samples were analyzed for PCBs. Therefore, no background sample is available for PCBs (Ref. 6, p. 14 Table 2-13).

PCBs are man-made substances and do not occur naturally in the environment (Ref. 17, p. 1). PCBs were widely used as lubricants and coolants in capacitors, transformers, and other electrical equipment. Products that may contain PCBs include electrical devices containing PCB capacitors made before PCB use was banned, old microscope oil, old hydraulic oil, and old fluorescent lighting fixtures (Ref. 17, p.2).

CT&E Environmental Services, Inc used Analysis Method SW846-6020 for the analysis of priority pollutants and vanadium, Analysis Method SW846-7471A for the analysis of mercury by cold vapor, and Analysis Method SW846-8082 for PCBs. CT&E Environmental Services, Inc used practical quantitation limits (PQL) in lieu of sample quantitation limits (SQLs) or method detection limits (MDLs) (Ref. 6, App. A, pp. A-150 – A-153, A-158 – A-163).

Although PQLs are generally in accord with contract required quantitation limits (CRQL), and Method Detection Limits (MDL), PQLs are typically higher than CRQLs or MDLs. Therefore, PQLs are not equal to CRQLs or MDLs (Ref. 22). Data validation was performed by URS (Ref. 6, pp. 10, 21, App. C, pp. C-1 – C-13). A second-party review of the URS data validation identified no major issues that would render the analytical data to be rejected or unusable (Ref. 23). Analytical data sheets, sample chain of custody records, and QA/QC information are presented in Reference 6, Appendices A and C.

Sample SCIT-3 was collected in Zone A, from the northwest pile surrounding the Rock Jetty and Tailings Spit (Refs. 6, p. 13, Table 2-11, Figure 2-4). Sample SCIT-3 was composed of fine gray-green tailings of fine silt (Refs. 12; 14, p. 8). Sample SCIT-5 was collected in Zone B from the northeast pile next to the piers (Ref. 6, p. 13, Table 2-11, Figure 2-4). A physical description of sample SCIT-5 was not provided (Refs. 12; 13, p. 8). Sample SCSD-9 and its duplicate sample SCSD-10, and sample SCSD-18 were collected in Zone D from tailings north of an unnamed island (Ref. 6, p. 13, Table 2-11, Figure 2-4). Sample SCSD-9 was composed of tailings, silts, and fine sands (Refs. 12; 14, p. 13; 15, p. 10). Sample SCSD-10 is a duplicate sample to SCSD-9 (Ref. 6, Tables 2-11 and 2-12; 12; 15, p. 10). Sample SCSD-18 was collected from the north end of the unnamed island and consisted of black saturated tailings and sediment (Refs. 12; 14, p. 23; 15, p. 11).

| Table 1 - Hazardous Substances Associated with Source 1<br>2002 EE/CA Sampling Investigation | | | | | | |
|---|---|---|---|---|---|---|
| **Sample ID/ Lab ID** | SCSD-12/ 1025324002 | SCIT-5/ 1024753002 | SCSD-9[a]/ 1024753005 | SCSD-10[a]/ 1024753006 (SCSD-9 Duplicate) | SCSD-18/ 1024753007 | SCIT-3/ 1024753001 |
| **Sample Collection Date** | 7/25/02 | 7/23/02 | 7/24/02 | 7/24/02 | 7/26/02 | 7/23/02 |
| **Location** | Background Browns Bay West of Gosti Island | Zone B- Northeast Pile Next to Piers | Zone D North of Unnamed Island | Zone D North of Unnamed Island | Zone D North of Unnamed Island | Zone A- Northwest Pile Surrounding Rock Jetty and Tailings Spit |
| **Reference** | 6, Table 2-13, App. A, pp. A-217, A-222; 12; 14, pp. 15, 16 | 6, Tables 2-11 & 2-12, App. A, pp. A-145, A-152, A-153; 12; 13, p. 8 | 6, Tables 2-11 & 2-12, App. A, pp. A-145, A-158, A-159; 12; 14, p. 13; 15, p. 10 | 6, Tables 2-11 & 2-12, App. A, pp. A-145, A-160, A-161; 12; 14, p. 13; 15, p. 10 | 6, Tables 2-11 & 2-12, App. A, pp. A-145, A-162, A-163; 12; 14, p. 23; 15, p. 11 | 6, Tables 2-11 & 2-12, App. A, pp. A-145, A-150, A-151; 12; 14, p. 8 |
| **Analyte (mg/kg)** | | | | | | |
| Copper | 11.2 (2.29 PQL) | 2,110 (2.27 PQL) | 874J (2.46 PQL) | 460J (2.53 PQL) | 270 (2.46 PQL) | 2,580 (2.20 PQL) |
| Selenium | ND (1.14) | | | | | 1.48 (1.10 PQL) |
| Silver | ND (0.114) | 0.320 (0.113 PQL) | 0.634 (0.123 PQL) | 0.336 (0.127 PQL) | 0.227 (0.123 PQL) | 1.02 (0.110 PQL) |
| Vanadium | 40.8 (2.29 PQL) | 438 (2.27 PQL) | 291J (2.46 PQL) | 290J (2.53 PQL) | 170 (2.46 PQL) | 256 (2.20 PQL) |
| **Analyte (mg/kg)** | | | | | | |
| Aroclor 1254 | NA | 0.235 (0.0349 PQL) | | 2.19 (0.191 PQL) | | |
| Aroclor 1260 | NA | 0.221 (0.0349 PQL) | | 1.59 (0.191 PQL) | | |

Notes:

[a] Please note that the analytical data summary tables presented in Reference 6 depict results that have been averaged for a designated sample and its duplicate. However the table above presents the actual result for each sample.

ID - Identification
App. - Appendix
mg/kg - Milligrams per kilogram
µg/kg - Micrograms per kilogram
PQL - Practical Quantitation Limit (Ref. 22)
ND - The constituent was analyzed for but was not detected; value presented is the practical quantitation limit.
NA - Not available; the designated background sample was not analyzed for PCBs.

Blank cells indicate that the associated result did not exceed concentrations detected in background samples for inorganics analyses or was not detected for organics analyses.

Sediment sample SCSD-22, was collected from Browns Bay, a control location west of Gosti Island, approximately 2.5 miles South of the intertidal tailings piles, is used as the background sample for tailings pile samples collected during the 2006 sampling investigation (Refs 3;. 6, p. 13, Table 2-13). Sediment sample SCSD-22 was composed of dark gray to brown silty sands containing crushed clam shells and some gravel (Refs. 12; 16A, p. 12).

During the 2006 EE/CA sampling investigation, six samples, including one duplicate sample (SCIT-12, SCIT-7, SCIT -8, SCIT-10, SCIT-13, and SCSD-27), were collected from the intertidal tailings and were analyzed for total metals, mercury, and selenium by Columbia Analytical Services, Inc. Sample SCSD-27 also was analyzed for PCBs (Ref. 6, p 13, Table 2-11, App. B, pp. B-687 – B-689, B-702 – B-704, and B-1,361). Background sample SCSD-22 was analyzed for total metals; however, it was not analyzed for PCBs (Ref. 6, p. 13, Table 2-13, App. B. p. B-699). Columbia Analytical Services used Analysis Method 6020 for total metals and Analysis Method 7471A for mercury, and used MDLs in lieu of SQLs (Ref. 6, App. B, pp. B-687 – B-689, B-699, B-702 – B-704). Data validation was performed by URS (Ref. 6, pp. 10, 21, App. D, pp. D-1 – D-20). A second party review of the URS data validation identified no major issues that would render the analytical data to be rejected or unusable (Ref. 23). Analytical data sheets, sample chain of custody records, and QA/QC information are presented in Reference 6, Appendices B and D.

Sample SCIT-12 was collected in Zone C, from the thinned tailings next to a low tide seep and Lake Ellen Creek. Sample SCIT-7 and its duplicate SCIT-8, and samples SCIT-13, and SCSD-27 were collected in Zone D from tailings north of an unnamed island (Ref. 6, p. 13, Table 2-11, Figure 2-4). Intertidal tailings samples SCIT-7 and SCIT-8 were composed mostly of tailings with some organics (Refs. 12; 16, pp. 4, 16; 16A, p. 1). Sample SCIT-12 contained sandy tailings with small amounts of rockweed, clay, black to dark grey mineral soil, and gravel. Tailings were estimated to be 16 inches deep at the sample location (Refs. 12; 16A, pp. 29, 30). Sample SCIT-13 contained tailings and anaerobic soils and gravel. Tailings were estimated to be 2.25 feet deep at the sample location (Refs. 12; 16, p. 35). Sample SCSD-27 contained clay, some rocks and sand, and black anaerobic soil (Refs. 12; 16A, pp. 32, 33).

| Table 2 - Hazardous Substances Associated with Source 1<br>2006 EE/CA Sampling Investigation | | | | | | |
|---|---|---|---|---|---|---|
| **Sample ID/ Lab ID** | SCSD-22/ K0608882-016 | SCIT-12/ K0608882-032 | SCIT-7[a]/ K0608882-002 | SCIT-8[a]/ K0608882-003 (Duplicate to SCIT-7) | SCIT-13/ K0608882-020 | SCSD-27/ K0608882-031 |
| **Sample Collection Date** | 9/30/06 | 10/04/06 | 9/27/06 | 9/27/06 | 10/06/06 | 10/04/06 |
| **Location** | Background Browns Bay West of Gosti Island | Zone C Thinned Tailings Next to Low Tide Seep and Lake Ellen Creek | Zone D North of Unnamed Island | Zone D North of Unnamed Island | Zone D North of Unnamed Island | Zone D North of Unnamed Island |
| **Reference** | 6, Table 2-13, App. B, pp. B-637, B-699; 12; 16, p. 18; 16A, p. 12 | 6, Table 2-11, App. B, pp. B-640, B-704; 12; 16, p. 16; 16A, pp. 29, 30 | 6, Table 2-11, App. B, pp. B-636, B-687; 12; 16, pp. 4, 16 | 6, Table 2-11, App. B, pp. B-636, B-688; 12; 16, pp. 4, 16 | 6, Table 2-11, App. B, pp. B-638, B-702; 12; 16, pp. 16, 35 | 6, Table 2-11, App. B, pp. B-640, B-703; 12; 16, p. 18; 16A, pp. 32, 33 |
| **Analyte (mg/kg)** | | | | | | |
| Copper | 14.4 (0.25 MDL) | 1,370 (2.60 MDL) | 1,580 (2.65 MDL) | 1,590 (2.78 MDL) | 153 (0.26 MDL) | 50.1 (0.27 MDL) |
| Mercury | 0.009J (0.004 MDL) | 0.243 (0.004 MDL) | 0.086 (0.004 MDL) | 0.103 (0.004 MDL) | 0.072 (0.004 MDL) | |
| Vanadium | 59.3 (0.08 MDL) | 296 (0.09 MDL) | | | | |

Notes:

[a] Please note that the analytical data summary tables presented in Reference 6 depict results that have been averaged for a designated sample and its duplicate. However the table above presents the actual result for each sample.

J - The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL

ID - Identification

App. - Appendix

mg/kg - Milligrams per kilogram

MDL - Method Detection Limit

ND - The constituent was analyzed for but was not detected; value presented is the MDL.

Blank cells indicate that the associated result did not exceed concentrations detected in background samples.

### 2.4.2 Hazardous Waste Quantity

#### 2.4.2.1.1 Hazardous Constituent Quantity

Available data are insufficient to document a hazardous constituent quantity (Ref. 1, p. 51590, Section 2.4.2.1.1).

Hazardous Constituent Quantity Value (C): NS

#### 2.4.2.1.2 Hazardous Wastestream Quantity

Available data are insufficient to document a hazardous wastestream quantity (Ref. 1, p. 51591, Section 2.4.2.1.2).

Hazardous Wastestream Quantity (W): NS

#### 2.4.2.1.3 Volume

The 2007 EE/CA Report indicated that the intertidal tailings cover approximately 100,000 $yd^3$, based on aerial photograph evidence and field data. Tailings deposits were believed to range in thickness from about 10 feet southwest of the mill to less than 1 foot near the southern edge of the intertidal tailings. The maximum thickness of tailings in Zone D of the saturated intertidal tailings was reported to be 4 feet. However, precisely how the volume of the tailings was determined was not specified (Ref. 6, pp. 3, 7, Figures 2-4 and 2-5). The value assigned to the volume measure is calculated as follows: 100,000 $yd^3 \div 2.5$ $yds^3 = 40{,}000$ (Ref. 1, p. 51591)

Volume Assigned Value (V): 40,000
Ref. 1, p. 51591, Table 2-5

#### 2.4.2.1.4 Area

Alternatively the area of the saturated intertidal tailings was not evaluated based upon the 23 acres of estimated tailings as specified in the 2007 EE/CA Report (Ref. 6, pp. 3, 7, Figure 2-4). The value assigned to the area measure is calculated as follows: 23 acres x 43,560 (1 acre = 43,560 $ft^2$) = 1,001,880 $ft^2 \div 13$ $ft^2 = 77{,}067.69$ (Ref. 1, p 51591, Section 2.4.2.1.4).

Area Assigned Value (A): 0

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Source Hazardous Waste Quantity Value: 40,000

**SOURCE DESCRIPTION**

## 2.2 SOURCE CHARACTERIZATION

Number of the Source: 2

Name and description of the source: Saturated Stream Bottom Tailings (Tailings Pile)

Smaller areas of tailings are located above the intertidal zone along the tailings spit, around the mill, adjacent to the unnamed stream, and in the bottom of the unnamed stream. The tailings located in the stream bed of the unnamed stream are referred to as saturated stream bottom tailings and are evaluated as Source No. 2. The smaller areas of tailings located above the intertidal zone are referred to as the unsaturated tailings and will be evaluated as Source No. 3. Combined, the saturated intertidal tailings, saturated stream bottom tailings, and unsaturated tailings were reported to cover approximately 23 acres (Refs. 6, p. 3).

As indicated in the 2007 Draft EE/CA Report, analytical results of samples collected from Salt Chuck Mine tailings were divided into three groups: unsaturated tailings (tailings located above the intertidal zone), saturated tailings (tailings located in the intertidal zone), and saturated stream bottoms (tailings located in the bottom of the unnamed stream) (Ref. 6, p. 9, 10).

Inorganic analytical results of samples collected from the saturated stream bottom tailings revealed detectable levels of copper, lead, nickel, silver, vanadium, and zinc (Ref. 6, Table 2-10). Inorganic analytical results of samples collected from the saturated stream bottom tailings during the 1995 sample event reportedly revealed detectable levels of arsenic, chromium, copper, lead, mercury, nickel, silver, vanadium, and zinc. No inorganic analytical results were reported for the 1997 sampling event (Ref. 6, Table 2-10).

Location of the source, with reference to a map:
The saturated stream bottom tailings are located in the stream bed of the unnamed stream located just southwest of the boiler located on pile D15 (Refs. 3; 6, pp. 2, 3, Figures 2-1; 2-2). See Figure 2 in this documentation record.

Containment
Release to Surface Water via Overland Migration and/or Flood: The saturated stream bottom tailings are located within the unnamed stream and are not contained in a manner that prohibits contaminants within the tailings from migrating into the waters of the unnamed stream. There is no evidence of a maintained engineered cover, or functioning and maintained run-on control system and runoff management system associated with the saturated stream bottom tailings (Refs. 6, pp. 2, 3, Figure 2-1, Figure 2-5; 7, p. 32). Therefore, a containment value of 10 is assigned (Ref. 1, p. 51609, Table 4-2).

Containment Value: 10

### 2.2.2 Hazardous Substances

Table 3 below list hazardous substances present in the saturated stream bottom tailings based on analytical results from the EE/CA 2002 sampling investigation (Ref. 6, Table 2-10; App. A, p. A-83). Although not required when documenting hazardous substances associated with a source area, as a conservative approach, only inorganic sample results exceeding concentrations detected in background samples, included to represent concentrations of inorganics typical of native soil, are included in Table 3 below. Furthermore, analytical results of background samples are presented to demonstrate the relative increase in hazardous substance levels in the tailings waste, and thus the increased threat posed to the environment, as compared to naturally occurring levels in surrounding soils.

For Source No.2, sediment sample SCSD-12, collected from Browns Bay, a control location west of Gosti Island, approximately 2.5 miles South of the intertidal tailings piles, is used as the background sample for the saturated stream bottom tailings pile sample collected during the 2002 sampling investigation (Refs. 6, p. 12, Table 2-13; 12; 15, pp. 3, 10). The 2002 background sample was collected from a control location west of Gosti Island, which is outside the range of activities that occurred at Salt Chuck Mine (Refs. 6, Figures 2-7 and 2-13; 12; 14, p. 16; 15, p. 10). Sample Locations are presented in Figures 3 and 4.

During the 2002 EE/CA sampling investigation, one sample (SCST-1) was collected from the saturated stream bottom tailings located within the unnamed stream, and was analyzed for priority pollutant metals and vanadium by CT&E Environmental Services, Inc. (Ref. 6, p 12, Table 2-10, App. A, p. A-83). Background sample SCSD-12 also was analyzed for priority pollutant metals and vanadium (Ref. 6, p. 13, Table 2-13, App. A. p. A-222). CT&E Environmental Services, Inc used Analysis Method SW846 6020 for the analysis of priority pollutants and vanadium, and used PQLs in lieu of SQLs or MDLs (Ref. 6, App. A, pp. A-83, A-222). Although PQLs are generally in accord with contract required quantitation limits (CRQL), and Method Detection Limits (MDL), PQLs are typically higher than CRQLs or MDLs. Therefore, PQLs are not equal to CRQLs or MDLs (Ref. 22). Data validation was performed by URS (Ref. 6, pp. 10, 21, App. C, pp. C-1 – C-13). A second party review of the URS data validation identified no major issues that would render the analytical data to be rejected or unusable (Ref. 23). Analytical data sheets, sample chain of custody records, and QA/QC information are presented in Reference 6, Appendices A and C.

Saturated stream bottom tailings sample SCST-1 was collected from the unnamed stream between two unsaturated tailings piles designated as D14 and D15 located on either side of the unnamed stream. A physical description of the sample was not provided (Refs. 6, Table 2-10, Figure 2-2; 12; 15, p. 3).

| Table 3 - Hazardous Substances Associated with Source 2<br>2002 EE/CA Sampling Investigation | | |
|---|---|---|
| **Sample ID/<br>Lab ID** | SCSD-12<br>1025324002 | SCST-1<br>1024752020 |
| **Sample Collection Date** | 7/25/02 | 7/23/02 |
| **Location** | Background<br>Browns Bay<br>West of Gosti Island | Southern end of the Unnamed Stream prior to its confluence with Salt Chuck Bay at high tide |
| **Reference** | 6, Table 2-13, App. A, pp. A-217, A-222; 12; 14, p. 16; 15, p. 10 | 6, Table 2-10, Figure 2-2, App. A, pp. A-51, A- 83; 12; 15, pp. 3, 9 |
| **Analyte (units = mg/kg)** | | |
| Copper | 11.2<br>(2.29 PQL) | 709<br>(4.56 PQL) |
| Lead | 0.876<br>(0.229 PQL) | 4.51<br>(0.456 PQL) |
| Silver | ND (0.114) | 0.373<br>(0.228 PQL) |
| Vanadium | 40.8<br>(2.29 PQL) | 225<br>(4.56 PQL) |

Notes:

| | | |
|---|---|---|
| ID | - | Identification |
| mg/kg | - | Milligrams per kilogram |
| PQL | - | Practical Quantitation Limit |
| ND | - | The constituent was analyzed for but was not detected; value presented is the practical quantitation limit. |

**2.4.2 Hazardous Waste Quantity**

**2.4.2.1.1 Hazardous Constituent Quantity**

Available data are insufficient to document a hazardous constituent quantity (Ref. 1, p. 51590, Section 2.4.2.1.1).

Hazardous Constituent Quantity Value (C): NS

**2.4.2.1.2 Hazardous Wastestream Quantity**

Available data are insufficient to document a hazardous wastestream quantity (Ref. 1, p. 51591, Section 2.4.2.1.2).

Hazardous Wastestream Quantity (W): NS

**2.4.2.1.3 Volume**

Insufficient data was available to determine the volume of the saturated stream bottom tailings; therefore, the value assigned to the volume measure is greater than 0. However, hazardous substances are present in this source (Ref. 1, p. 51591, Section 2.4.2.1.3)

Volume Assigned Value (V): > 0
Ref. 1, p. 51591, Table 2-5

**2.4.2.1.4 Area**

Insufficient data was available to determine the area of the saturated stream bottom tailings; therefore, the value assigned to the area measure is greater than 0. However, hazardous substances are present in this source (Ref. 1, p 51591, Section 2.4.2.1.4).

Area Assigned Value (A): 0

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Source Hazardous Waste Quantity Value: > 0

**SOURCE DESCRIPTION**

## 2.2 SOURCE CHARACTERIZATION

Number of the source: 3

Name and description of the source: Unsaturated Tailings (Tailings Pile)]

Smaller areas of tailings are located above the intertidal zone along the tailings spit, around the mill, and adjacent to the unnamed stream (Piles D14 and D15). The smaller areas of tailings located above the intertidal zone are referred to as the unsaturated tailings and will be evaluated as Source No. 3. Combined, the saturated intertidal tailings, saturated stream bottom tailings, and unsaturated tailings were reported to cover approximately 23 acres (Refs. 6; p. 3)

As indicated in the 2007 Draft EE/CA Report, analytical results of samples collected from Salt Chuck Mine tailings were divided into three groups: unsaturated tailings (tailings located above the intertidal zone), saturated tailings (tailings located in the intertidal zone), and saturated stream bottoms (tailings located in the bottom of the unnamed stream) (Ref. 6, p. 9, 10).

Inorganic analytical results of samples collected from the unsaturated tailings during the 2002 EE/CA sampling event revealed detectable levels of antimony, arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, vanadium, and zinc (Ref. 6, Table 2-8). Inorganic analytical results of samples collected from the unsaturated tailings during the 1995 sample event reportedly revealed detectable levels of antimony, arsenic, barium, chromium, copper, lead, mercury, nickel, silver, vanadium, and zinc (Ref. 6, Table 2-8).

Organic analytical results of samples collected from the unsaturated tailings during the 2002 EE/CA sampling event revealed detectable levels of PCBs. (Ref. 6, Table 2-9). Organic analytical results of samples collected from the unsaturated tailings during the 1995 sampling event only included diesel range organics. No organic analytical results were reported for the 1997 sampling event (Ref. 6, Table 2-9)

Location of the source, with reference to a map:
The unsaturated tailings (including Piles D14 and D15) are located above the intertidal zone along the tailings spit, around the mill, adjacent to the unnamed stream (Ref. 6, p. 3, Figure 2-2; Also see Figure 2 in this documentation record).

Containment:
Release to Surface Water via Overland Migration and/or Flood:
The unsaturated tailings are located adjacent to the unnamed stream and are not contained in a manner that prohibits contaminants within the tailings from migrating into the waters of the unnamed stream. There is no evidence of a maintained engineered cover, or functioning and maintained run-on control system and runoff management system associated with the unsaturated tailings (Refs. 6, pp. 2, 3, Figure 2-4; 7, p. 32). Therefore, a containment value of 10 is assigned (Ref. 1, p. 51609, Table 4-2).

Containment Value: 10

### 2.2.2 Hazardous Substances

Table 4 below list hazardous substances present in the unsaturated tailings piles based on analytical results from the EE/CA 2002 sampling investigations (Ref. 6, Tables 2-5, 2-8, 2-9, App. A, pp. A-71, A-72, A-74, A-75, A-77, A-78, A-80, A-81, A-164 – A-167, A-172, A-173). Although not required when documenting hazardous substances associated with a source area, as a conservative approach, only inorganic sample results exceeding concentrations detected in background samples, included to represent concentrations of inorganics typical of native soil, are included in Table 4 below. Furthermore, analytical results of background samples are presented to demonstrate the relative increase in hazardous substance levels in the tailings waste, and thus the increased threat posed to the environment, as compared to naturally occurring levels in surrounding soils.

For Source No. 3, surface soil samples SCSSBG-1, SCSSBG-2, and SCSSBG-5, collected outside the range of activities that occurred at Salt Chuck Mine are used as background samples for the unsaturated tailings pile samples collected during the 2002 sampling investigation (Ref. 6, Table 2-5, Figure 2-1, App. A, pp. A-164-A-167, A-172-A-173; 12; 15, pp. 5, 9). Sample SCSSBG-1 was collected west of Lake Ellen Creek. Sample SCSSBG-2 was collected from the southeast side of Salt Chuck Bay, east of the unnamed island. Sample SCSSBG-5 was collected across the road from the turn off leading to the glory hole. The physical description of samples SCSSBG-1 and SCSSBG-2 were not provided (Refs. 12; 15, pp. 5, 9, 13). Sample SCSSBG-5 was composed of a mixture of orange and white sandy soil (Refs. 12; 15, pp. 9, 13). The highest concentration of a constituent detected in the background sample was used as comparison to the source sample. Sample Locations are presented in Figures 3 and 4.

The 2002 EE/CA sampling investigation included four samples, including one duplicate sample (SCUT-3, SCUT-4, SCUT -5, and SCUT-6) collected from the unsaturated tailings and were analyzed for priority pollutant metals and vanadium, and PCBs by CT&E Environmental Services, Inc. (Ref. 6, p 12, Tables 2-8 and 2-9, Figure 2-2, App. A, pp. A-71 – A-81). Background samples SCSSBG-1, SCSSBG-2, and SCSSBG-5 were analyzed for priority pollutant metals and vanadium; however, the background samples were not analyzed for PCBs (Ref. 6, p. 11, Table 2-5, App. A. p. A-164 – A-167, A-172, A-173). Furthermore, no samples other than tailings samples were analyzed for PCBs. Therefore, no background sample is available for PCBs (Ref. 6, pp. 10, 12, Tables 2-5, 2-8, and 2-9). PCBs are man-made substances and do not occur naturally in the environment (Ref. 17, p. 1). PCBs were widely used as lubricants and coolants in capacitors, transformers, and other electrical equipment. Products that may contain PCBs include electrical devices containing PCB capacitors made before PCB use was banned, old microscope oil, old hydraulic oil, and old fluorescent lighting fixtures (Ref. 17, p.2).

CT&E Environmental Services, Inc used Analysis Method SW846 6020 for the analysis of priority pollutants and vanadium, Analysis Method SW846-7471A for the analysis of mercury by cold vapor, and Analysis Method SW846-8082 for PCBs.  CT&E Environmental Services, Inc used PQLs in lieu of SQLs or MDLs (Ref. 6, App. A, pp. A-71 – A-81, A-164 – A-167, A-172, A-173).  Although PQLs are generally in accord with contract required quantitation limits (CRQL), and Method Detection Limits (MDL), PQLs are typically higher than CRQLs or MDLs.  Therefore, PQLs are not equal to CRQLs or MDLs (Ref. 22).  Data validation was performed by URS (Ref. 6, pp. 10, 20, 21, App. C, pp. C-1 – C-13).  A second party review of the URS data validation identified no major issues that would render the analytical data to be rejected or unusable (Ref. 23).  Analytical data sheets, sample chain of custody records, and QA/QC information are presented in Reference 6, Appendices A and C.

Unsaturated tailings sample SCUT-3 was collected from tailings located near the southwest corner of the mill building.  No description of the physical sample was provided.  Tailings sample SCUT-4 and its duplicate sample SCUT-5 were collected from an area of mixed waste rock and tailings (Refs. 12; 13, p. 15).  Sample SCUT-6 was collected from tailings south of the mill building (Refs 6, Figure 2-2; 12; 13, p. 20; 15, p. 9).

| Table 4 - Hazardous Substances Associated with Source 3<br>2002 EE/CA Sampling Investigation | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID/ Lab ID** | SCSSBG-1/ 1024753008 | SCSSBG-2/ 1024753009 | SCSSBG-5/ 1024753012 | SCUT-3/ 1024752016 | SCUT-4[a]/ 1024752017 | SCUT-5[a]/ 1024752018 (Duplicate to SCUT-4) | SCUT-6/ 1024752019 |
| **Sample Collection Date** | 7/25/02 | 7/25/02 | 7/26/02 | 7/25/02 | 7/25/02 | 7/25/02 | 7/25/02 |
| **Location** | Background West side of Salt Chuck Bay | Background East of Unnamed Island | Background 700 Feet North of Glory Hole | SW of Mill at Edge of Intertidal Zone | SW Corner of Mill | SW Corner of Mill | SE OF Mill Next to Barge |
| **Reference** | 6, Table 2-5, App. A, pp. A-145, A-164, A-165; 12; 15, p. 9 | 6, Table 2-5, App. A, pp. A-145, A-166, A-167; 12; 15, pp. 5, 9 | 6, Table 2-5, App. A, pp. A-146, A-172, A-173; 12; 15, pp. 9, 13 | 6, Tables 2-8 and 2-9; App. A, pp. A-51, A-71, A-72; 12; 13, p. 15 | 6, Tables 2-8 and 2-9; App. A, pp. A-51, A-74, A-75; 12; 13, p. 15 | 6, Tables 2-8 and 2-9; App. A, pp. A-51, A-77, A-78; 12; 13, p. 15 | 6, Tables 2-8 and 2-9; App. A, pp. A-51, A-80, A-81; 12; 13, p. 20; 15, p. 9 |
| **Analyte (mg/kg)** | | | | | | | |
| Cadmium | ND (0.237) | ND (0.245) | ND (0.256) | 0.350 (0.233 PQL) | 0.970 (0.221 PQL) | 0.981 (0.213 PQL) | 0.832 (0.237 PQL) |
| Copper | 10.2 (2.37 PQL) | 45.6 (2.45 PQL) | 23.0 (2.56 PQL) | 53,400 (116 PQL) | 9670 (22.1 PQL) | 9350 (21.3 PQL) | 11,000 (23.7 PQL) |
| Lead | 16.1 (0.237 PQL) | 3.23 (0.245 PQL) | 8.26 (0.256 PQL) | 83.9 (0.233 PQL) | 87.6 (0.221 PQL) | 58.7 (0.213 PQL) | 143 (0.237 PQL) |
| Selenium | ND (1.18) | ND (1.22) | ND (1.28) | 65.4 (1.16 PQL) | 8.63 (1.11 PQL) | 8.12 (1.07 PQL) | 11.3 (1.19 PQL) |
| **Analyte (mg/kg)** | | | | | | | |
| Aroclor 1254 | NA | NA | NA | 0.120 (0.0349 PQL) | 0.375 (0.0334 PQL) | 0.112 (0.0324 PQL) | |
| Aroclor 1260 | NA | NA | NA | 0.121 (0.0349 PQL) | 0.237 (0.0334 PQL) | 0.112 (0.0324 PQL) | |

Notes:

a Please note that the analytical data summary tables presented in Reference 6 depict results that have been averaged for a designated sample and its duplicate. However the table above presents the actual result for each sample.

ID - Identification
mg/kg - Milligrams per kilogram
µg/kg - Micrograms per kilogram
PQL - Practical Quantitation Limit
ND - The constituent was analyzed for but was not detected; value presented is the practical quantitation limit.
NA - Not available; the designated background sample was not analyzed for PCBs.

Blank cells indicate that the associated result was not detected for organics analyses.

**2.4.2 Hazardous Waste Quantity**
**2.4.2.1.1 Hazardous Constituent Quantity**

Available data are insufficient to document a hazardous constituent quantity (Ref. 1, p. 51590, Section 2.4.2.1.1).

Hazardous Constituent Quantity (C): NS

**2.4.2.1.2 Hazardous Wastestream Quantity**

Available data are insufficient to document a hazardous wastestream quantity (Ref. 1, p. 51591, Section 2.4.2.1.2).

Hazardous Wastestream Quantity (W): NS

**2.4.2.1.3 Volume**

Insufficient data was available to determine the volume of the unsaturated tailings; therefore, the value assigned to the volume measure is greater than 0 (Ref. 1, p. 51591, section 2.4.2.1.3)

Volume Assigned Value: > 0
Ref. 1, p. 51591, Table 2-5

**2.4.2.1.4 Area**

Insufficient data was available to determine the area of the unsaturated tailings; therefore, the value assigned to the area measure is greater than 0. However, hazardous substances are present in the source (Ref. 1, p 51591, Section 2.4.2.1.4).

Area Assigned Value (A): 0

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Source Hazardous Waste Quantity Value: >0

SUMMARY OF SOURCE DESCRIPTIONS

| **Source Number** | **Source Hazardous Waste Quantity Value [a]** | **Containment Value for Surface Water [b]** |
|---|---|---|
| 1. Saturated Intertidal Tailings | 40,000 | 10 |
| 2. Saturated Stream Bottom Tailings | > 0 | 10 |
| 3. Unsaturated Tailings | > 0 | 10 |
| **Total** | **40,000** | NA |

Notes:
[a] See section 2.2 of this document.
[b] Ref. 1, pp. 51609, 51610, Table 4-2.

**<u>Other Possible Sources:</u>**

- Main adit (Salt Chuck Mine): Water from the main adit was reported to contain dissolved copper and selenium (Ref. 6, p. 17).
- Salt Chuck Mine contaminated soils. Soils east of the mill were reported to contain copper, lead, and PCBs (Ref. 6, pp. 7, 8). Soils adjacent to a former assay shop were reported to contain copper, lead, mercury, and other metals at concentrations above background (Ref. 6, p 11).
- Lead batteries from an electric locomotive located north of the mill (Ref. 6, p. 8). Soil downhill from the electric locomotive reportedly contained lead and antimony (Ref. 7, p. 29).

## 4.1 OVERLAND/FLOOD MIGRATION COMPONENT

### 4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

Some surface water runoff at the Salt Chuck Mine enters the large glory hole connected to the main haulage adit, located at the 300-foot elevation and subsequently drains into the haulage level of the main adit where the surface water runoff mixes with ground water that has entered the adit through faults, fractures and shear zones in the overlying country rock. A steady trickle discharges from the portal with an estimated flow rate of less than 0.1 cubic feet per second (cfs) (Refs. 3; 6, p. 5; 7, p. 11). Observations made by URS personnel during the 2002 EE/CA sampling event indicate the flow at the main adit during the sampling investigation was approximately 1 to 2 gallons per minute (gpm) (Refs. 12; 13, p. 7). Therefore, 2 gpm x 0.002228 (1 gpm = 0.002228 cfs) = 0.004456 cfs.

It is a reasonable assumption that surface water runoff that does not enter the main haulage adit flows into a small unnamed stream that emanates from Power Lake, northeast of Salt Chuck Mine, and bisects the mining site property and converges with runoff discharging from the main haulage adit. The unnamed stream reportedly overflows its channel near the main adit, during high flow events, and flows both west along the established drainage and south along the railroad line, and then into the head waters of Salt Chuck Bay, west of the mill, where it converges with Lake Ellen Creek during low tide (Refs 3; 6, p. 5, Figures 2-1, 2-2, and 2-4; 7, p. 11). The flow rate of the unnamed stream was estimated to be between 1 and 10 cfs, based upon observations made by U.S. Bureau of Land Management (BLM) personnel during the 1997 Removal Preliminary Assessment (Refs. 3; 7, pp. 11, 30, 156 – 157, 203, 204). In addition, Lake Ellen Creek, which originates from Lake Ellen, approximately 0.5 mile west of Salt Chuck Mine, flows along the western portion of Salt Chuck Mine into Kasaan Bay (Refs. 6, p. 5; 7, pp. 11, 12). The flow rate of Lake Ellen Creek was estimated to be between 15 and 20 cfs, based upon observations made by BLM personnel during the 1997 Removal Preliminary Assessment (Refs. 3; 7, pp. 11, 154 – 157, 203, 204).

The U.S. Geological Survey (USGS) does not document annual flow rates for the unnamed stream or Lake Ellen Creek. The nearest USGS gauging stations are located at Old Tom Creek and Staney Creek (Ref 24). Old Tom Creek flows into Skowl Arm of Kasaan Bay approximately 3 miles beyond the 15-mile target distance limit, and is located near Kasaan, approximately 16 miles south, southeast of Salt Chuck Mine (Refs. 3; 24, p. 3; 25). Staney Creek flows into the Tuxekan Passage and is located near Klawock, approximately 24 miles northwest of Salt Chuck Mine (Refs. 3; 24, p. 10; 25). The average annual flow rate for Old Tom Creek is 42.7 cfs; the drainage area is 5.90 square miles (Ref. 24, pp. 3, 5). The average annual flow rate for Staney Creek is 374 cfs; the drainage area is 50.6 square miles (Ref. 24, pp. 10, 12). Based on observations made by BLM personnel during the 1997 Preliminary Assessment, the uplands portion of the Salt Chuck Mine area comprises approximately 45 acres (Ref. 7, p. 3). Both Old Tom Creek and Staney Creek are longer than Lake Ellen Creek (Refs. 3; 6, Figure 2-1; 25, pp. 1, 2). Although Old Tom Creek appears to be similar in size to Lake Ellen Creek, the elevation surrounding Old Tom Creek is higher than the elevation of areas surrounding Lake Ellen Creek (Ref. 3). Based on the flow rate for Staney Creek, which has a drainage area similar to Lake Ellen Creek, and to take a more conservative approach, Lake Ellen Creek is estimated to have an average annual flow rate between 100 and 1,000 cfs.

There are multiple probable points of entry (PPE) to surface water bodies located near Salt Chuck Mine. Tailings have been documented in the bottom of the unnamed stream (Source 2). Copper, lead, silver, and vanadium have been detected in sample SCST-1 collected from the southern end of the unnamed stream, in between two unsaturated tailings piles (Source 3) located on either side of the stream, just prior to its convergence into Salt Chuck Bay, at high tide (Refs. 6, p. 3, Table 2-10, Figure 2-2; 15, pp. 3, 9; also see Figure 2 in this documentation record). Tailings located in the stream bottom of the unnamed stream are Source No. 2. Therefore, the Source No. 2 PPE to the unnamed stream is at sample location SCST-1. Additional PPEs to the unnamed stream are where runoff from the unsaturated tailings piles comprising Source 3 enters the unnamed stream. Runoff from tailings located on either side of the unnamed stream enters the stream at the same general location of sample SCST-1 prior to its convergence into Salt Chuck Bay (Ref 6, p. 3, Figure 2-2). Runoff from tailings located near the mill flows south into Salt Chuck Bay. At low tide, the unnamed stream flows in between two unsaturated tailings piles (Source 3) into Lake Ellen Creek, southwest of the intertidal tailings pile (Source 1), prior to entering Salt Chuck Bay (Refs. 6, p. 5, Figures 2-1, 2-2, and 2-4; 7, pp. 11, 12 . At high tide, saltwater from Salt Chuck Bay floods the lower portions of Lake Ellen Creek, the unnamed stream, and the main tailings pile (Refs. 6, p. 5, Figures 2-1, 2-2, and 2-4; 7, pp. 11, 12). Therefore, the PPE for the intertidal tailings (Source 1) is anywhere the tailings come into contact with the waters of Salt Chuck Bay. Salt Chuck Bay is coastal tidal water (Ref. 3). Due to the tidal influence, the surface water migration pathway extends 15 miles both southwest, into the Twelvemile Arm of Kasaan Bay, and to the southeast into the main portion of Kasaan Bay. The PPEs and 15-Mile Surface Water Migration Pathway Target Distance Limit (TDL) are presented on Reference 3.

Lake Ellen Creek is an anadromous fish stream that supports pink, coho, and chum salmon, dolly varden, and steelhead (Refs. 7, pp. 12, 17, 34; 18, p. 99; 19, p. D-49). Crucial habitat for salmon rearing and schooling extends to a depth of 40 feet at mean lower low water at the mouths of anadromous fish streams unless ADNR indicates otherwise (Ref. 18, p. 86). Numerous pink salmon were observed in the drainage leading to Lake Ellen during the initial hazards inventory examination conducted in 1995, and the BLM sampling events conducted in 1995 and 1997 (Ref. 7, pp. 17, 18, 30).

According to the Alaska Department of Natural Resources (ADNR), Karta Bay and Salt Chuck are unique areas with high fish and wildlife habitat and harvest values and recreation values. Karta Bay, adjacent and downstream to Salt Chuck Bay, is an important community sockeye salmon harvest area (Ref. 18, pp. 85, 86). The intertidal area of Salt Chuck Bay is reported to support an abundance of shellfish (Refs. 6, p. 7; 7, pp. 17, 18). The Salt Chuck Bay area is designated for intensive community use for harvest of clams, crab, and oysters; Karta Bay is designated for intensive community use for harvest of sockeye salmon, steelhead, and crab (Ref. 18, p. 87). The native Village of Kasaan utilizes Salt Chuck Bay, including in the area where the intertidal tailings are located, Karta Bay, and Kasaan Bay for subsistence activities and cultural and traditional uses, including fishing (Refs. 19, pp. D-106, D-132, and D-133; 20, p. 3; 26). A cursory inspection of the intertidal zone south of the mill, conducted during the PA, revealed abundant blue mussels, little neck clams, softshell clams, butter clams, and juvenile dungeness crabs (Ref. 7, pp. 17, 18).

ADNR identifies Salt Chuck and Karta Bays as crucial habitat for seasonal black bear concentrations, seasonal waterfowl concentrations, herring spawning, salmon rearing and schooling (Ref. 18, p 87). Bear and deer tracks were observed on the tailings near Lake Ellen

Creek during BLM investigation activities (Ref. 7, p. 30). In addition, the humpback whale, a state-designated threatened and endangered species, has been observed in the area (Refs. 7, p. 18; 18, p. 48; 19, p. D-45). ADNR designates Salt Chuck Bay as an area of intensive public recreation use (Refs. 6, pp. 6, 23; 18, pp. 88, 89). Furthermore, Salt Chuck Bay, Karta Bay, and Kasaan Bay are designated as National Wild and Scenic Rivers (Ref. 19, p. D-33a).

Kasaan Bay, located downstream from Salt Chuck Bay and Karta Bay, supports abundant fish and wildlife (Ref. 18, p. 105). Several areas along the west side of Kasaan Bay, downstream of Karta Bay are classified as crucial habitat for herring spawning and salmon rearing and schooling. An area along the east side of Kasaan Bay, downstream of Salt Chuck Bay is designated as an area of intensive commercial harvest (Ref. 18, pp. 115-117, 135). Twelvemile Arm flows southwest from the upper portion of Kasaan Bay and supports several anadromous fish streams designated as crucial habitat for salmon rearing and schooling and seasonal black bear concentrations (Ref. 18, pp. 106, 121, 133, 137).

**4.1.2.1 LIKELIHOOD OF RELEASE**
**4.1.2.1.1 Observed Release**

Direct Observation

- Basis for Direct Observation

All zones (A, B, C, and D) comprising the saturated intertidal tailings pile (Source No. 1) are inundated in Salt Chuck Bay during high tide (Ref. 6, pp. 3, 5, Figure 2-4; 7, pp. 14, 17). The saturated stream bottoms tailings pile (Source No. 2) is located in the stream bed of the unnamed stream (Ref. 6, p. 3). Therefore, the Surface Water Migration Pathway was evaluated based on observed release by direct observation (Ref. 1, Section 4.1.1.2, p. 51605).

Copper, mercury, selenium, silver, vanadium, aroclor 1254, and aroclor 1260 have been detected in samples collected from the saturated intertidal tailings (Source No. 1) (Ref. 6, pp. 13, 14, Tables 2-11 – 2-13, App. A, pp. A-150 – A-153, A-158 – A-163, A-222, App. B, pp. B-687, B-688, B-699, B-702 – B-704). Also see Source No. 1, Section 2.2.2, Tables 1 and 2, in this documentation record.

Copper, lead, silver, and vanadium were detected in samples collected from the saturated stream bottom tailings (Source No. 2) (Ref. 6, p. 12, Tables 2-10 and 2-13, App. A, pp. A-83, A-222). Also see Source No. 2, Section 2.2.2, Table 3, in this documentation record.

Chemical Analysis

- An observed release to Salt Chuck Bay and the unnamed stream is established by direct observation.

**Attribution:**

In 1905, the first claims to Salt Chuck Mine were staked, and by 1907, approximately 35 feet of adit had been driven, a short shaft sunk, and several surface cuts had been opened (Refs 6, p. 2; 7, p. 9). The discovery that the ore contained palladium/platinum led to construction of the mill with a capacity of processing 30 tons of ore per day in 1917. In 1923, the mill was enlarged to a capacity of 300 tons per day. Between 1934 and 1941, the Alaska Gold and Metals Company retreated 11,000 tons of tailings and mined 80,000 tons of ore from the original stopes. In 1941, production at Salt Chuck Mine ceased (Ref. 7, p. 9). Copper, gold, silver, and platinum group elements, most notably palladium, were the primary ores produced from Salt Chuck Mine (Ref. 6, p. 2). Between 1905 and 1941, total production from Salt Chuck Mine yielded 326,000 tons of ore at an average grade of 0.95 percent copper, 0.063 oz/ton palladium, 0.036 oz/ton gold, and 0.17 oz/ton silver (Ref. 7, p. 9).

Former mine workings are located between 100 and 300 feet elevation and consist of a large glory hole connected to a main haulage adit, two mine shafts, and a tunnel. The remnants of at least 25 structures were present in the Salt Chuck Mine area as of March 2007. Former buildings are located near the beach, along the tramway leading from the main haulage adit to the former mill, upstream along an unnamed stream that flows past the portal of the main haulage adit and near the glory hole. Buildings and former mining camps include cabin sites formerly used to house and feed workers, a superintendent's house, a general office, a blacksmith or machine shop, a large mill, and platforms used to load and transfer rock. (Refs. 6, p. 3; 7, p. 3).

Thirteen mine waste rock dumps, ranging in size from over 100 $yd^3$ to over 4,000 $yd^3$, are distributed along a 0.5 mile corridor from the northeast side of the glory hole, south to the mill located at the head of Salt Chuck Bay. A large amount of waste rock also used to create a tramway bed leading from the main haulage adit to the mill (Refs. 6, p. 3; 7, p. 3). An extensive tailings deposit, approximately 100,000 $yd^3$ in size, is located within the intertidal zone south and southeast of the mill (Ref. 6, p. 3, Figure 2-4). Smaller areas of tailings are located above the intertidal zone around the mill area, adjacent to the unnamed stream, and within the unnamed stream, along the bottom of the stream bed. All of the tailings deposits combined comprise an area of approximately 23 acres (Ref. 6, p. 3).

Levels of copper, mercury, selenium, silver, and vanadium above native levels, and detectable levels of PCBs have been detected in source samples collected from the saturated intertidal tailings pile (Source No. 1), submerged in Salt Chuck Bay (Refs. 6, pp 13, 14, Tables 2-12 and 2-13, App. A, pp. A-150 – A-153, A-158 –A-163, A-222, App. B, pp. B-687, B-688, B-699, B-702 – B-704). Levels of copper, lead, silver, and vanadium above native levels have been detected in the saturated stream bottoms tailings (Source No. 2), submerged in the unnamed stream (Ref. 6, p 12, Tables 2-10, 2-13, App. A, pp. A-83, A-222). In addition, levels of cadmium, copper, lead, and selenium above native levels, and detectable levels of PCBs have been detected in the unsaturated tailings piles (Ref. 6, p 12, Tables 2-8 and 2-9, App. A, pp. 71 – 82, 164 – 167, 172, 173). Ore mined from Salt Chuck mine contained copper and silver (Ref. 7, p. 9). The PCBs detected in Sources 1 and 3 may have come from former electrical equipment located at the mill (Ref. 6, p. 8).

PCBs are man-made substances and do not occur naturally in the environment (Ref. 17, p. 1). PCBs were widely used as lubricants and coolants in capacitors, transformers, and other electrical equipment. Products that may contain PCBs include electrical devices containing PCB capacitors made before PCB use was banned, old microscope oil, old hydraulic oil, and old fluorescent lighting fixtures (Ref. 17, p.2).

Although Salt Chuck Mine is located in a remote area of Alaska removed from any industrial areas, several other mines are located in the vicinity (Ref. 3). The Rush & Brown Mine is located on the west slope of Lake Ellen, which is located southwest of Salt Chuck Mine. Venus Mine is located approximately 1.5 miles southwest of Salt Chuck Mine in an area that drains south into Karta Bay. Haida Mine is located northeast of Browns Bay and approximately 2.5 miles southeast of Salt Chuck Mine (Refs. 3; 6, p. 2).

**Hazardous Substances Released**

Hazardous Substances Released (Documented by Direct Observation):

Copper
Lead
Mercury
Selenium
Silver
Vanadium
Aroclor 1254
Aroclor 1260

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Observed Release Factor Value: 550

### 4.1.3.2 WASTE CHARACTERISTICS
#### 4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Table 5 below provides Human Food Chain Threat Waste Characteristics Factor Values for those hazardous substances present in sources at Salt Chuck Mine (see Section 2.2).

**Table 5 Human Food Chain Threat Waste Characteristics Factor Values**

| Hazardous Substance | Source | Toxicity Factor Value | Persistence Factor Value[a] | Bio-accumulation Factor Value[b] | Toxicity/ Persistence/ Bio-accumulation Factor Value | Page Number in Reference 2 |
|---|---|---|---|---|---|---|
| Cadmium | 3 | 10000 | 1.0000 | 50000 | $5.0 \times 10^{8}$ | BI-2 |
| Copper | 1, 2, 3 | 0 | 1.0000 | 50000 | 0.0 | BI-3 |
| Lead | 2, 3 | 10000 | 1.0000 | 5000 | $5.0 \times 10^{7}$ | BI-8 |
| Mercury | 1 | 10000 | 1.0000 | 50000 | $5.0 \times 10^{8}$ | BI-8 |
| Selenium | 1, 3 | 100 | 1.0000 | 500 | $5.0 \times 10^{4}$ | BI-10 |
| Silver | 1, 2 | 100 | 1.0000 | 50000 | $5.0 \times 10^{6}$ | BI-10 |
| Vanadium | 1, 2 | 100 | 1.0000 | 500 | $5.0 \times 10^{4}$ | BI-11 |
| Aroclor 1254[c] | 1, 3 | 10000 | 1.0000 | 50000 | $5.0 \times 10^{8}$ | BI-10 |
| Aroclor 1260[c] | 1, 3 | 10000 | 1.0000 | 50000 | $5.0 \times 10^{8}$ | BI-10 |

Notes:

[a] River persistence values were used (Ref. 2).

[b] Food chain bioaccumulation values for salt water (Refs. 1, p. 51617; 2). At high tide, salt water from Salt Chuck Bay inundates the lower portions of the unnamed stream and Lake Ellen Creek. According to BLM personnel, barnacles, fuchus and other saltwater biota residing in and along portions of these streams demarcate the extent of the tidal fluctuation (Refs. 6, p. 5; 7, p. 12). Also, fresh water bioaccumulation values are the same as salt water values for mercury and PCBs, the constituents with the highest waste characteristics factor values (Ref. 2, pp. BI-8, BI-10).

[c] Aroclors are commonly referred to as polychlorinated biphenyls (PCBs) (Ref. 17, p.443, 444). ). PCB values are used for these compounds.

The hazardous substances having the highest Toxicity/Persistence/Bioaccumulation Value of $5 \times 10^{8}$ are cadmium, mercury, and PCBs.

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Toxicity/Persistence/Bioaccumulation Factor Value: $5 \times 10^{8}$

SWOF/Food Chain – Hazardous Waste Quantity

#### 4.1.3.2.2 Hazardous Waste Quantity

| Source Number | Source Hazardous Waste Quantity Value [a] | Containment Value for Surface Water [b] |
|---|---|---|
| 1. Saturated Intertidal Tailings | 40,000 | 10 |
| 2. Saturated Stream Bottom Tailings | > 0 | 10 |
| 3. Unsaturated Tailings | > 0 | 10 |
| **Total** | **40,000** | NA |

Notes:
[a] see Section 2.2 of this document.
[b] Ref. 1, p. 51610, Table 4-2

A hazardous waste quantity factor value of 10,000 is assigned (Ref. 1, p. 51591).

Hazardous waste quantity factor value: 10,000
(Ref. 1, p. 51591, Table 2-6)

#### 4.1.3.2.3 Waste Characteristics Factor Category Value

Toxicity/persistence factor value x hazardous waste quantity factor value: $1 \times 10^{8}$ (Ref. 1, p. 51592)

$10{,}000 \times 10{,}000 = 1 \times 10^{8}$, capped at $1 \times 10^{8}$

(Toxicity/persistence [10,000] x hazardous waste quantity [10,000]) x food chain bioaccumulation factor value [$5 \times 10^{4}$] = $5 \times 10^{12}$ (Ref. 1, p. 51592)

$(1 \times 10^{8}) \times (5 \times 10^{4}) = 5 \times 10^{12}$, capped at $1 \times 10^{12}$

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Hazardous Waste Quantity Factor Value: 10,000
Waste Characteristics Factor Category Value: 1,000
Ref. 1, p. 51592, Table 2-7

**4.1.3.3 HUMAN FOOD CHAIN TARGETS**
**4.1.3.3.1 Food Chain Individual**

A fishery, Salt Chuck Bay, within the Target Distance Limit (TDL) is subject to actual human food chain contamination because hazardous substances are present in a source area (Source 1) that is in direct contact with the surface waters of Salt Chuck Bay and at least a portion of the fishery is within the boundaries of the observed release (Ref. 1, p. 51620). A Food Chain Individual factor value of 45 is assigned for Level II actual contamination based on an observed release by direct observation (Ref. 1, Section 4.1.1.2, p. 51605). The native Village of Kasaan utilizes Salt Chuck Bay, including in the area where the intertidal tailings are located, for subsistence activities and cultural and traditional uses, including fishing (Refs. 19, pp. D-106, D-132, and D-133; 20, p. 3; 26).

Food Chain Individual Factor Value: 45

**4.1.3.3.2 Population**

4.1.3.3.2.1 Level I Concentrations

Level I concentrations for the Human Food Chain Threat is not being evaluated.

Level I Concentrations Factor Value: 0

4.1.3.3.2.2 Level II Concentrations

Level II is assigned for observed releases established by direct observation (Ref. 1, Section 4.1.1.2, p. 51605).

The assigned human food chain population value for greater than 0 to 100 pounds of fish is 0.03 [Ref. 1, p. 51621 (Table 4-18)].

Level II Concentrations Factor Value: 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The assigned Human Food Chain population value for 0 to 100 lbs of fish is 0.03 (Ref. 1, p. 51621, Table 4-18). Salt Chuck Bay is coastal tidal water. The dilution weight for coastal tidal water is 0.0001 (Ref. 1, p. 51613, Table 4-13). The potential targets value for the Human Food Chain Threat is calculated as follows (Ref. 1, pp. 51613 and 51621).

0.03 x 0.0001 = 0.000003 / 10 = 0.0000003

Potential Human Food Chain Contamination Factor Value: 0.0000003

### 4.1.4.2 WASTE CHARACTERISTICS
#### 4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Table 6 below provides Environmental Threat Waste Characteristics Factor Values for those hazardous substances present in sources at USDA FS Tongass NF: Salt Chuck Mine (see Section 2.2).

**Table 6 Environmental Threat Waste Characteristics Factor Values**

| Hazardous Substance | Source | Ecosystem Toxicity Factor Value [a] | Persistence Factor Value [b] | Bio-accumulation Factor Value [a] | Ecosystem Toxicity/ Persistence/ Bio-accumulation Factor Value | Page Number in Reference 2 |
|---|---|---|---|---|---|---|
| Cadmium | 3 | 1000 | 1.0000 | 50000 | $5 \times 10^7$ | BI-2 |
| Copper | 1, 2, 3 | 1000 | 1.0000 | 50000 | $5 \times 10^7$ | BI-3 |
| Lead | 2, 3 | 1000 | 1.0000 | 5000 | $5 \times 10^6$ | BI-8 |
| Mercury | 1 | 1000 | 1.0000 | 50000 | $5 \times 10^8$ | BI-8 |
| Selenium | 1, 3 | 100 | 1.0000 | 500 | $5 \times 10^4$ | BI-10 |
| Silver | 1, 2 | 10000 | 1.0000 | 50000 | $5 \times 10^8$ | BI-10 |
| Vanadium | 1, 2 | 0 | 1.0000 | 500 | 0.0 | BI-11 |
| Aroclor 1254[c] | 1, 3 | 10000 | 1.0000 | 50000 | $5 \times 10^8$ | BI-10 |
| Aroclor 1260[c] | 1, 3 | 10000 | 1.0000 | 50000 | $5 \times 10^8$ | BI-10 |

Notes:

[a] Salt water values were used (Ref. 1, p. 51621). At high tide, salt water from Salt Chuck Bay inundates the lower portions of the unnamed stream and Lake Ellen Creek. According to BLM personnel, barnacles, fuchus and other saltwater biota residing in and along portions of these streams demarcate the extent of the tidal fluctuation (Refs. 6, p. 5; 7, p. 12). Also, fresh water ecotoxicity and bioaccumulation values are the same as salt water values for mercury and PCBs, the constituents with the highest waste characteristics factor values (Ref. 2, pp. BI-8, BI-10).

[b] River persistence values were used (Ref. 1, p. 51621).

[c] Aroclors are commonly referred to as polychlorinated biphenyls (PCBs) (Ref. 17, p.443, 444). PCB values are used for these compounds.

The hazardous substances having the highest Ecosystem Toxicity/Persistence/Bioaccumulation Factor value of $5 \times 10^8$ are mercury, silver, and PCBs.

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Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: $5 \times 10^8$

#### 4.1.4.2.2 Hazardous Waste Quantity

| Source Number | Source Hazardous Waste Quantity Value [a] | Containment Value for Surface Water [b] |
|---|---|---|
| 1. Saturated Intertidal Tailings | 40,000 | 10 |
| 2. Saturated Stream Bottom Tailings | > 0 | 10 |
| 3. Unsaturated Tailings | > 0 | 10 |
| **Total** | **40,000** | NA |

Notes:
[a] see Section 2.2 of this document.
[b] Ref. 1, p. 51610, Table 4-2

A hazardous waste quantity factor value of 10,000 is assigned (Ref. 1, p. 51592).

Hazardous waste quantity factor value: 10,000
(Ref. 1, p. 51591, Table 2-6)

#### 4.1.4.2.3 Waste Characteristics Factor Category Value

Ecosystem toxicity/persistence factor value x hazardous waste quantity factor value: $1 \times 10^8$ (Ref. 1, p. 51624)

10,000 x 10,000 = $1 \times 10^8$, capped at $1 \times 10^8$

(Ecosystem toxicity/persistence x hazardous waste quantity factor value) x ecosystem bioaccumulation potential factor value: $5 \times 10^{12}$ (Ref. 1, p. 51624)

$(1 \times 10^8) \times (50{,}000) = 5 \times 10^{12}$, capped at $1 \times 10^{12}$

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Hazardous Waste Quantity Factor Value: 10,000
Waste Characteristics Factor Category Value: 1,000
Ref. 1, Section 2.4.2.2, Table 2-7

### 4.1.4.3 ENVIRONMENTAL THREAT – TARGETS

#### 4.1.4.3.1 Sensitive Environments

Sensitive Environments

Tailings containing hazardous substances (Source 1) are located in Salt Chuck Bay extending from the northern portion of Salt Chuck Bay, across portions of Lake Ellen Creek and extending to the northeastern area of the unnamed island (Ref. 6, Figures 2-4, 2-10, and 2-11; also see Source 1, Section 2.2.2 in this documentation record).

Lake Ellen Creek is an anadromous fish stream that supports pink, coho, and chum salmon, dolly varden, and steelhead (Refs. 7, pp. 12, 17, 34; 18, p. 99; 19, p. D-49). Crucial habitat for salmon rearing and schooling extends to a depth of 40 feet at mean lower low water at the mouths of anadromous fish streams unless ADNR indicates otherwise (Ref. 18, p. 86).

ADNR identifies Salt Chuck and Karta Bay as crucial habitat for seasonal black bear concentrations, seasonal waterfowl concentrations, herring spawning, salmon rearing and schooling (Ref. 18, p 87). Bear and deer tracks were observed on the tailings near Lake Ellen Creek during BLM investigation activities (Ref. 7, p. 30). Furthermore, Salt Chuck Bay, Karta Bay, and Kasaan Bay are designated as National Wild and Scenic Rivers (Ref. 19, p. D-33).

Several areas along the west side of Kasaan Bay, downstream of Karta Bay are classified as crucial habitat for herring spawning and salmon rearing and schooling. Twelvemile Arm flows southwest from the upper portion of Kasaan Bay and supports several anadromous fish streams designated as crucial habitat for salmon rearing and schooling and seasonal black bear concentrations (Ref. 18, pp. 106, 121, 133, 137).

Wetlands

According to the 1997 Preliminary Assessment, wetland frontage is present along most of the length of the unnamed stream (Refs. 6, p. 6; 7, p. 12). According to the National Wetland Inventory, the wetlands located along the unnamed stream are freshwater forested wetlands (Ref. 21). An exact measurement of the wetlands along the unnamed stream impacted by Source 2, saturated tailings located in the unnamed stream, could not be obtained (Ref. 6, Table 2-10, Figure 2-2, App. A, p. A- 83; also see Figure 5 in this documentation record). A conservative estimate of greater than 0.1 was used to evaluate the wetlands along the unnamed stream.

According to the National Wetland Inventory, Estuarine Intertidal Aquatic Bed wetlands are present along Lake Ellen Creek and Salt Chuck Bay (Ref. 21, Map CRAIG (C-2); also see Figure 5 in this documentation record). However, Estuarine Intertidal Aquatic Bed wetlands generally do not meet the 40 CFR Part 230.3 definition of eligible HRS wetlands, except for some shoals or reefs. Therefore, the wetlands located along Lake Ellen Creek and Salt Chuck Bay were not evaluated as environmental threat targets.

#### 4.1.4.3.1.1 Level I Concentrations

Level I concentrations for the Environmental Threat is not being evaluated.

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Level I Concentrations Factor Value: 0

#### 4.1.4.3.1.2 Level II Concentrations

Level II is assigned for observed releases established by direct observation (Ref. 1, Section 4.1.2.1.1, p. 51609, Section 4.1.4.3.1.2, p. 51625).

Sensitive Environments

Table 7 provides a summary of sensitive environments subject to Level II contamination (Ref. 1, p. 51624, Table 4-23). Tailings containing hazardous substances (Source 1) are located in Salt Chuck Bay extending from the northern portion of Salt Chuck Bay, across portions of Lake Ellen Creek and extending to the northeastern area of the unnamed island (Ref. 6, Figures 2-4, 2-10, and 2-11; also see Source 1, Section 2.2.2 in this documentation record).

**Table 7 Sensitive Environments Subject to Level II Contamination**

| Environment Name | Environment Type (Ref. 1, p. 51624, Table 4-23) | Environment Value | Multiplier (1 for Level II) | Product |
|---|---|---|---|---|
| Salt Chuck Bay | Spawning area critical for the maintenance of fish/shellfish species within a bay or estuary (Ref. 18, p. 87). | 75 | 1 | 75 |
| Salt Chuck Bay | National/Federal-designated Scenic or Wild River (Ref. 19, p. D-33). | 50 | 1 | 50 |
| | | | | **Total: 125** |

Sum of Sensitive Environment Value: 125

Wetlands

According to the National Wetland Inventory, the wetlands located along the unnamed stream are freshwater forested wetlands (Ref. 21, Map CRAIG (C-2)). An exact measurement of the wetlands along the unnamed stream impacted by Source 2, saturated tailings located in the unnamed stream, could not be obtained (Ref. 6, Table 2-10, Figure 2-2, App. A, p. A- 83; also see Figure 5 in this documentation record). A conservative estimate of greater than 0.1 was used to evaluate the wetlands along the unnamed stream.

Sum of Wetlands Value (Ref. 1, p. 51625, Table 4-24): 25

Sum of Sensitive environment value + wetland value: 150

Level II Concentration Factor Value: 150

#### 4.1.4.3.1.3 Potential Contamination

Sensitive Environments

Table 8 provides a summary of sensitive environments subject to Potential concentrations (Ref. 1, pp. 51613, Table 4-13, and 51624, Table 4-23). Although one-time field observations made by BLM personnel during the 1997 Preliminary Assessment resulted in an estimated flow rate of 15 to 20 cfs, the USGS does not document annual flow rates for Lake Ellen Creek (Refs. 7, pp. 11, 154 – 157, 204; 24). The nearest USGS gauging stations are located at Old Tom Creek and Staney Creek (Ref 24, pp. 1, 3, 10). The average annual flow rate for Old Tom Creek is 42.7 cfs; the drainage area is 5.90 square miles (Ref. 24, pp. 3, 5). The average annual flow rate for Staney Creek is 374 cfs; the drainage area is 50.6 square miles (Ref. 24, pp. 10, 12). Based on observations made by BLM personnel during the 1997 Preliminary Assessment, the uplands portion of the Salt Chuck Mine area comprises approximately 45 acres (Ref. 7, p. 3). Both Old Tom Creek and Staney Creek are longer than Lake Ellen Creek (Refs. 3; 6, Figure 2-1; 25, pp. 1, 2). Although Old Tom Creek appears to be similar in size to Lake Ellen Creek, the elevation surrounding Old Tom Creek is higher than the elevation of areas surrounding Lake Ellen Creek (Ref. 3). Based on the flow rate for Staney Creek, which has a drainage area similar to Lake Ellen Creek, and to take a more conservative approach, Lake Ellen Creek is estimated to have an average annual flow rate between 100 and 1,000 cfs.

| Table 8 | | Sensitive Environments Subject to Potential Contamination | | | |
|---|---|---|---|---|---|
| **Flow** | **Dilution Weight** | **Environment Type** | **Environment Value** | **Potential Contamination** | **Product** |
| > 100 – 1,000 cfs (Refs. 3; 24) | 0.01 | Lake Ellen Creek - Spawning area critical for the maintenance of fish/shellfish species within a bay or estuary (Ref. 18, pp. 86, 99). | 75 | 0.1 | 0.075 |
| NA – Coastal Tidal Water (Ref. 3) | 0.0001 | Karta Bay - Spawning area critical for the maintenance of fish/shellfish species within a bay or estuary (Ref. 18, p 87). | 75 | 0.1 | 0.00075 |
| NA – Coastal Tidal Water (Ref. 3) | 0.0001 | Kasaan Bay - Spawning area critical for the maintenance of fish/shellfish species within a bay or estuary (Ref. 18, pp. 106, 135). | 75 | 0.1 | 0.00075 |
| NA – Coastal Tidal Water (Ref. 3) | 0.0001 | Twelve Mile Arm - Spawning area critical for the maintenance of fish/shellfish species within a bay or estuary (Ref. 18, pp. 106, 121, 133, 137). | 75 | 0.1 | 0.00075 |
| NA – Coastal Tidal Water (Ref. 3) | 0.0001 | Karta Bay - National/Federal-designated Scenic or Wild River (Ref. 19, p. D-33a). | 50 | 0.1 | 0.0005 |
| NA – Coastal Tidal Water (Ref. 3) | 0.0001 | Kasaan Bay - National/Federal-designated Scenic or Wild River (Ref. 19, p. D-33a). | 50 | 0.1 | 0.0005 |
| | | | | **Total** | **0.07825** |

Notes:

cfs Cubic feet per second
NA Not Applicable

Sum of Potential Contamination Sensitive Environment Value: 0.07825

Wetlands

Not scored.

Sum of Wetlands Value (Ref. 1, p. 51625, Table 4-24): 0

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Potential Contamination Factor Value: 0.07825